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ABSTRACT

The nationwide study reported here was designed to (1) identify the essential agricultural competencies needed for entry employment and advancement in the major agriculture and agribusiness occupations and (2) validate the importance of identified competencies for each occupation. Following a brief project summary, the remainder of the report is comprised of the appendix in which the major 59 production agriculture and 139 agribusiness occupations surveyed in the study are listed by instructional area. Each occupation includes a job description, job competencies (each with sub-competencies), a weighted mean rating each competency on the degree of its importance, a brief description of the surveyed population, and the agency conducting the survey. The occupations are categorized according to the following seven instructional areas: production agriculture, agricultural supplies and services, agricultural mechanics, agricultural products, horticulture, renewable natural resources, and forestry. (BM)

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FINAL REPORT

Project No. 498AH60366
Contract No. 300760096

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IDENTIFYING AND VALIDATING ESSENTIAL COMPETENCIES NEEDED FOR ENTRY AND ADVANCEMENT IN MAJOR AGRICULTURE AND AGRIBUSINESS OCCUPATIONS

May 16, 1978

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education
Occupational and Adult Education Branch

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ABSTRACT

Title of Project: Identifying and Validating Essential Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations

Project Director: David R. McClay

Contracting Agency: Instructional Consulting and Research Associates, Inc.
732 Holmes Street
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Beginning and Ending Dates: May 17, 1976 through May 16, 1978

PURPOSE: To identify the essential agricultural competencies needed for entry employment and advancement in the major agriculture and agribusiness occupations and to validate the importance of the competencies identified for each occupation by workers employed in the occupation.

METHOD: Teacher Educators in Agricultural Education in 40 colleges and universities throughout the nation identified and surveyed the major occupations included in this report. A task analysis process was used to identify the essential agricultural competencies by each project participant assisted by a local advisory committee of persons employed in the occupation or their employers, or other competent knowledgeable persons. Completed questionnaires were obtained from persons employed in each occupation and from their work supervisors nationwide. Responses were summarized and a weighted mean for each competency was determined for each occupation.

FINDINGS: Fifty-seven major production agriculture and 139 agribusiness occupations were identified and validated. For most occupations, over 30 validations were obtained for each occupation representing all regions of the Nation.

Final Report

Project No. 498AH60366
Contract No. 300760096

Title of Report

IDENTIFYING AND VALIDATING ESSENTIAL COMPETENCIES NEEDED FOR ENTRY AND ADVANCEMENT IN MAJOR AGRICULTURE AND AGRIBUSINESS OCCUPATIONS

Subtitle of Report

National Study for Identifying and Validating Essential Agricultural Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations

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The research reported herein was performed pursuant to a contract with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education
Occupational and Adult Education Branch

FOREWORD

Vocational education programs in agriculture in the nation's schools were first established over 60 years ago with some financial encouragement from Federal Funds. Through the years many changes have emerged to make these educational programs more effective in meeting the needs of persons in or preparing for useful employment in agriculture.

The Vocational Education Act of 1963 passed by the United States Congress added new dimensions to vocational education programs in agriculture. The 1963 Act encouraged schools to offer vocational instruction for any occupation in agriculture/agribusiness where there was a need. This was a drastic change from the types of programs -- those only in production agriculture or farming -- receiving federal financial support prior to 1963.

This change in emphasis prompted Agricultural Education leaders to further examine the employment picture in agriculture and agribusiness, to determine just what were the occupations involved and how many workers were employed in each occupation. Surveys, census data, and studies of all types were made and examined to determine the occupations for which training should be provided and was needed. It was found that because of the many changes which had occurred in food and fiber production in the United States since World War II, many off-farm agricultural occupations had emerged. These occupations helped the American Farmer to more than double his total production of food and fiber in only 30 years.

The major purpose of this study in which teacher educators in Agricultural Education in 40 colleges and universities in the nation participated, was to identify the major occupations in production agriculture and in agribusiness which employed the most workers and the essential agricultural competencies or skills in each occupation a worker should possess for successful entry employment and advancement. But the purpose of this massive study did not stop there. After competency identification for each occupation was accomplished, workers employed in each occupation identified and their work supervisors were asked to evaluate the importance of each competency from their own experience in the occupation. This validation was obtained from workers and employers in all sections of the United States for most occupations. This information was needed by educational leaders to improve existing vocational-technical training programs in agriculture and agri-business and for establishing new programs.

This final report includes surveys of 57 production agriculture occupations and 139 agribusiness occupations. With this information, teachers of agriculture can base their courses of study on the competencies workers in the occupation say are important. This is an example of only one way the report may be effectively used. Additional suggested uses are included in another section of this publication.

David R. McClay

ACKNOWLEDGEMENTS

The identification of 196 major production agriculture and agribusiness occupations and the essential agricultural competencies needed by workers in each occupation was accomplished by Agricultural Education Teacher Educators, State Administrative Staff, and Agricultural Teachers in 35 states. In many of the 40 colleges and universities involved in this project, this mammoth task was added to the work loads of already busy faculty. In some institutions, state vocational funds were obtained for the employment of additional manpower for making the surveys. But in every case, completion of this National Study was made possible by the unselfish dedication of the professional educators involved.

The director of this study was given considerable help and counsel which he gratefully appreciated, by a National Steering Committee. The members of this committee were:

H. N. Hunsicker, U. S. Office of Education
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Dr. Glen Shinn, University of Missouri
Dr. Max Amberson, Montana State University
Dr. Glenn Morrill, University of Florida
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Dr. Jasper Lee, Mississippi State University
Mr. Warren Reed, California Department of Education

The professional educators in Agricultural Education who were responsible for the work done in this study and to whom special thanks should be given are listed on the following pages.

To the many graduate students, teachers, and others who worked on parts of this study, a special "thank you" is sincerely given for their devotion and labor.

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INTRODUCTION

Agricultural production in the United States is a modern day miracle. The increased productivity of our farmers allows us not only to be the best fed nation in the world at low cost for each family, but one of the leading nations in the exporting of food to other countries. This miracle of food production is possible in large part to the workers in hundreds of agricultural occupations related to farming which contribute services to the American farmer.

Vocational Education Acts and Amendments passed by Congress in recent years have demanded that Vocational Education in Agriculture in the Nation's schools offer training for all types of production agriculture and agribusiness occupations where there is a need.

History of the Study

After the passage of the Vocational Education Act of 1963, which set forth the philosophy that instructional programs should be developed and evaluated on the basis of manpower needs (employment opportunities), professional leaders in Agriculture Education soon recognized the void of such manpower information for the total industry of agriculture other than in farming. A National Consulting Committee of approximately 30 persons, representing a cross section of the agricultural industry, was formed by the U.S. Office of Education, Division of Vocational and Technical Education, (OE/DVTE). This committee met four or five times over a two-year period. Its final recommendations were that two national studies be made to:

A. Identify and validate the major production agriculture and agribusiness occupations and the employment (manpower) opportunities in each.

B. Determine the training needs (competencies required for entry) in each major occupation.

Extensive efforts were made to obtain funding for the Employment Opportunities Study. Unfortunately, the requests were denied, due chiefly to the myth, at that time, that agriculture was a dying industry.

Finally, in 1967, an official Interdepartmental Committee was formed, comprised of two representatives each from the United States Department of Agriculture, Department of Labor, Department of Commerce, and Department of Health, Education and Welfare, to implement the early recommendations. H. N. Hunsicker, of DVTE/HEW was selected as its Chairman. In 1974, without benefit of funding, but with much donated labor and extra hours of work by the committee members, the initial phases of "Part A" of the recommendations were completed, (Publication No. ERS-570 for Nation, plus ten Regional Supplements). Many (108) of the major production agriculture and agribusiness occupations were identified, validated, and manpower data were obtained for each. The work of this committee is continuing.

In June, 1973, a committee was formed under the direction of H. N. Hunsicker, Education Program Specialist, OE/DVTE, to develop strategies for undertaking "Part B" of the early recommendation, that of "Identifying and Validating Competencies Needed for Entry and Advancement in Major Agriculture/Agribusiness Occupations", especially those occupations included in Publication ERS 570. This committee was comprised of 14 individuals from 12 states, representing all sections of the country, plus H. E. Edwards, of the Chicago Regional OE office. The 3-day session was held in the Regional Office of USOE/DVTE in Chicago. Most of the individuals who attended this meeting did so at their own expense. Strategies and procedures for pursing the study were developed. Enthusiasm for the project was very pronounced, due to the crucial need for the project. The committee agreed to meet again in December, 1973, during the AVA Convention. Persons from each of the states represented on the Committee agreed to begin preliminary work on identifying competencies in one instructional employment area or sub-employment area.

The December, 1973, meeting of the committee was attended by approximately 30 representatives from 20 states. Strategies were refined. Dr. David R. McClay, The Pennsylvania State University, was unanimously elected Chairman and he has been unanimously re-elected to this responsibility each year since.

In May, 1974, with encouragement from OE/DVTE, Dr. McClay and H. N. Hunsicker, Education Program Specialist, DVTE, communicated with all states, informing them of the project and seeking their help on a voluntary basis. Those who were willing to cooperate were invited to attend a one and one-half day meeting in Columbus, Ohio in June, under the chairmanship of Dr. David McClay. Surprisingly, 52 persons from 40 states attended. Everyone present agreed that the proposed competency project was of highest priority and expressed a willingness to participate. The National Committee on Competencies was then enlarged to include representatives from 40 states. The committee strongly recommended USOE funding to help coordinate the project. Attempts to obtain such financial aid met with postponement. In view of disappointment in obtaining financial support, Dr. McClay agreed to devote as much time as possible in helping promote and coordinate the project among the various states.

In December, 1974, another meeting of the National Committee on Competencies in Agriculture and Agribusiness was held immediately prior to the AVA Convention, in New Orleans. Dr. McClay served as chairman. This meeting was attended by approximately 70 persons from 42 states. At that time, participating states gave progress reports, the format for reporting competencies by occupations was modified, and refinements were made in operating procedures. The need for involving other states and institutions became apparent as did the lack of personnel to coordinate the project and to provide essential leadership.

The idea of selecting seven area coordinators or "Steering Committee" members, one for each of the seven instructional-employment areas was approved. These area coordinators were chosen to assist Dr. McClay in working with the participating colleges and universities. This committee drafted a signed petition to be submitted to the Office of Education requesting financial help with the project. In addition, a resolution was adopted by approximately 800 professional agricultural educators attending AVA. These were transmitted to the Office of Education, asking for favorable consideration.

During the December, 1975, AVA Convention in Anaheim, California, the participating college and university representatives in the National Study held another meeting. This time it was pointed out that the project would need to be postponed indefinitely unless some OE or other source of funding could be found. A summary report of institutions involved showed increased interest and much progress within the individual states. However, without national leadership and coordination, each state was going its own way with a great deal of unnecessary duplication.

Funding, however, was approved and on May 17, 1976, Dr. McClay signed a contract with the USOE and began work on the project or National Study which was modestly funded until November 1977 (18 months). Later the expiration date was extended to May 16, 1978 without additional funding in order to successfully complete the study and to disseminate copies of the final report publication to Agricultural Educators nationwide.

Objectives of the Study

1. To identify the agricultural occupations at mid-management and below levels in the seven broad instruction areas:

   Production Agriculture
   Agricultural Supplies and Services
   Agricultural Mechanics
   Agricultural Products, Processing and Marketing
   Horticulture
   Renewable Natural Resources
   Forestry

2. To determine the agricultural competencies needed in each occupation identified for entry employment and advancement.

3. To validate nationally the competencies determined in each occupation by persons employed in the occupation and by their work supervisors.

4. To assemble the work of all participating states in the project.

5. To publish a final report and disseminate copies to all Agricultural Education leaders in all states.

Need for the Study

The identification of the competencies needed by a worker to enter employment in an agricultural occupation at midmanagement and below levels was urgently needed. Such information would be useful to public and private schools at the secondary and post secondary levels in establishing vocational or technical agricultural training programs. This information would aid teacher education departments to up-date their curricula for preparing teachers. This information would also be useful in preparing competency examinations for prospective teachers of agricultural occupations where needed. A list of the competencies required for entry employment in an occupation would be useful to teachers in placing students for supervised occupational experience (Cooperative Education).

The employment area taxonomy adopted in the National Study is listed in the USOE publication Standard Terminology for Curriculum and Instruction in Local and State School Systems.

Scope and Limitations of the Study

1. This study was primarily concerned with those production agriculture and agribusiness occupations where the employment entry was at the mid-management level or below. However, the study included all major production agriculture occupations.
2. The study included the identification of the major occupations in the seven instructional areas employing the most workers which are identified in the OE Taxonomy. The seven instructional areas are:

   Production Agriculture
   Agricultural Supplies and Services
   Agricultural Mechanics
   Agricultural Products - Processing and Marketing
   Horticulture
   Renewable Natural Resources
   Forestry
3. The specific major essential agricultural and agribusiness competencies (often referred to as skills, abilities, tasks, etc.) for successful entry and advancement in the respective occupations were listed under each occupation.
4. Validation nationally (regionally in a few instances where appropriate) was made by persons employed in the specific occupation and by their work supervisors.

5. Each institution that participated in this National Study was given maximum autonomy in carrying out its part of the study, following the agreed upon procedures adopted for the study.

This National Study was made with the cooperation of the United States Office of Education. Modest financial support from this agency provided the essential leadership needed to complete the study and for printing the final report.

PROCEDURE

Approximately 50 leaders in Agricultural Education representing 40 states met at Ohio State University in June, 1974. Specific plans were made for conducting this National Study. The participants at the conference were primarily teacher educators in Agricultural Education. Each participant selected the occupation cluster which they would survey according to the procedures unanimously adopted by the group. The group also selected a Steering Committee to assist the National Chairman in conducting the National Study.

Procedures Adopted for Conducting the National Study

1. Compile a complete list of occupations for each employment area under the instructional area selected. (See USOE publication Standard Terminology for Curriculum and Instruction in Local and State School Systems). Determine the approximate number of people employed in each occupation cluster.
2. Classify the occupations as skilled, technical and/or managerial, or professional.
3. Select skilled, technical and/or midmanagement occupations most students are likely to enter and limit this to a manageable number of occupations (two to five should fit most employment areas).

   Note: Often ten to twenty different occupations or job titles will be listed. Use your good judgement and common sense and eliminate all but the most important. Select only the occupations for the study which employ the most workers in the U. S., or regionally, in certain instances. In many instances, in some employment areas, workers with different job titles all do about the same kind of work. In these situations use your good judgement and combine the workers under the most appropriate occupational or job title which appears appropriate.
4. Prepare job descriptions for each of the selected occupations and list the other titles under which the occupation is often called.
5. List the important competencies through job and task analysis for the occupations selected.

   Note: Reasonable good judgement should be employed here. The most important technical agricultural and agribusiness competencies (each with sub-competencies or tasks) should be identified.

6. Select an Employer/Employee Review Group (E.E.R.G.) of five to fifteen persons from within the state, including persons employed in the occupation, farm and trade association personnel, employers, professional personnel, and other knowledgeable persons of a particular occupation or cluster of occupations.

7. Hold a meeting of the E.E.R.G. or interview them individually and have them review the survey instrument (questionnaire) prepared by the National Study leader in the participating college or university in order to modify, correct, or change the instrument for accuracy in determining relative importance of competencies for entry and advancement in an occupation. This is the pilot study portion of the study.

8. With the information obtained in the pilot study, revise the questionnaire or survey form adding any newly identified competencies and eliminating those competencies considered of no importance.

9. Select a national E.E.R.G. (Regional in a few instances where climatic and other factors affect an occupation) and obtain a minimum of 30 responses (completed questionnaires).

10. Have the E.E.R.G. classify the importance of the competencies according to the scale:

    Essential = 4
    Important = 3
    Of Some Importance = 2
    Not Important = 1
    Does Not Apply = 0

11. Summarize the N responses of the national E.E.R.G. survey for each competency in the occupation and prepare a report of the findings.

12. Final reports for all occupations should be sent to the National Project Chairman or Project Director: Dr. David R. McClay, 732 Holmes Street, State College, Pennsylvania 16801. Telephone (814) 237-3119.

Definitions

Authors and authorities in education differ somewhat in their definitions of certain words currently used in the field. For this National Study, the following definitions are accepted and will apply.

Competency - Behavioral characteristics of knowledge, skills, attitudes and judgement generally required for the successful performance of a task(s) or the sum total of attitudes, knowledge, and skills which enable a person to perform efficiently and effectively a given function.

Task or Sub-competency - A unit of work activity or operation that constitutes a logical and necessary step in the performance of a competency.

Agriculture and/or agribusiness competencies are those requiring skills in and knowledge of animal science, plant science, soil science, agricultural mechanics, agri-business, farm and business management, leadership, and human or personal relations.

RESULTS

The production agriculture and agribusiness occupations which employed the most workers in the United States were identified in this study. For each occupation the agricultural competencies were listed and a task-analysis procedure was applied to each competency. After a selected local Employer/Employee Review Group of experts had formed a concensus as to the adequacy of the competencies and tasks appropriate to an occupation, questionnaires were prepared and mailed to a random sampling of persons involved (either employees in or work supervisors of the occupations) nationwide. For a few occupations regional validation seemed most appropriate and is noted. Surveys of workers and their work supervisors in a few occupations were made by personal interview.

A partial check of responses given by work supervisors as compared to responses given by workers or technicians was made for a few occupations. In most instances work supervisors gave slightly higher values for competencies needed for entry and advancement than did workers or technicians in the occupation; however, there was relative uniformity of responses by both groups.

For most occupations an N of 30 or more was obtained. Because of unavoidable local restraints such as lack of man power to do the work required, a small number of occupations surveyed had an N of less than 30.

It was felt the participating institutions in this project should be given some freedom in deciding the format for reporting their work. Therefore limited editing was done to obtain conformity to a single format in listing competencies.

The final reports for the production agriculture and agribusiness occupations surveyed are given in the Appendix.

The intent of this project was to include surveys of all important agricultural and agribusiness occupations in the United States. It is recognized, however, that some agricultural and agribusiness occupations were omitted from the study due to oversight, lack of manpower for making the surveys, or for other reasons.

RECOMMENDATIONS

If more information is desired about an occupation or how an occupation was surveyed, the institution that did the work should be contacted directly. The institution's name and address is listed at the bottom of the first page of each occupation reported.

Agricultural Educators at all levels, including state administrators, teacher educators, and teachers will find this report to have many practical uses in improving existing vocational-technical agricultural and agribusiness educational programs in the nation's schools. Some ways this publication might be used are given below.

Some Uses of This Report

A. For Secondary School Vocational-Technical Programs.

1. Updating or evaluating the course of study offered in agriculture and agribusiness.

   The school identifies the occupations for which it attempts to offer instruction. By referring to these occupations in this publication, skills and/or competencies offered in the school vs. those included in this publication can be compared. Thus gaps can be filled, and non-essential skills offered but not needed can be dropped.

   It should be noted that for most occupations in this report, sub-competencies or tasks are listed under each competency area or subdivision of the occupation in descending value of the weighted means. In other words, the sub-competency or task with the highest weighted mean was listed first followed by sub-competencies or tasks with lower means.

   Teachers will note that often this procedure destroys the normal sequence for teaching students the sub-competencies or tasks essential for entry employment in an occupation. For example, teachers may prefer to teach sub-competency "b" before teaching sub-competency "a" in order that logical step-by-step instruction be given. This option is entirely up to the teacher. The important thing is that the instruction be the most effective way to teach the occupation in the teacher's judgement based upon his experience.

   In developing courses of study for production agriculture occupations, teachers should note that the essential agricultural mechanics competencies for most production agriculture occupations are omitted in each occupation's report. Essential agricultural mechanics competencies and skills needed by persons in production agriculture occupations are reported under the Agricultural Mechanics Instructional Area or Chapter of this publication.

2. Co-op training path for occupational preparation.

   No school can offer instruction for all production agricultural and agribusiness occupations. With the cooperation of businesses and persons in certain occupations in the community, high school students who have occupational goals not offered by the school's program of studies could be released from school on a cooperative education program with a farmer, local agribusiness, or individual for the training desired. The cooperating business or individual can be provided from this publication a list of the competencies for the occupation the student desires to master. This list can also serve for checking student progress by both the cooperating business and the teacher from the school.

3. Determining equipment and supplies needed.

   The school can use this publication to check equipment and supplies needed for optimum instruction based upon the competencies essential to the occupations included in the school's program of studies.

4. Establishing instruction for additional occupations.

   If a school determines through surveys and other means the need to add instruction for additional occupations, this publication provides, by listing the validated competencies or skills for the occupation, in essence, the course of study for this added program.

5. Teacher skill re-training needs.

   Teachers offering certain occupational training, by inspecting this report for the occupations taught, can identify skills and competencies in which they are deficient. Concerned teachers will find ways to remove their deficiencies.

B. For State Administrators.

1. This report can serve as a basis for evaluating agricultural programs in the state. Courses of study offered by a school for one or more agriculture or agribusiness occupations can be compared to the competencies and skills essential for entry employment and advancement for those occupations listed in this publication. Changes in the course of study can then be made where there are omissions and irrelevancies.

2. Teacher education programs provided in the state can be checked with use of the publication to determine how well prospective teachers are being prepared through college courses and/or experiences for the occupations for which teacher certifications will subsequently be requested.

3. This publication can be useful in working with schools which plan to establish new agriculture/agribusiness occupational training programs or courses. Questions like, "What kind of teacher will we need?", "What facilities will we need to provide?", and "What competencies or skills should be taught?" can be easily answered with this report in hand.

C. For Teacher Education Departments.

1. The report can serve as a guide to the technical agriculture needs of prospective teachers.

2. Prospective teachers, who because of extenuating circumstances cannot follow the usual academic path for certification to teach, may be required to successfully complete a competency examination for the occupation they wish to teach in agriculture and agribusiness. This report can serve as the basis for preparing the technical agriculture phase of the competency examination for the occupation.

3. Teacher educators through in-service teacher education programs will find this report useful in helping teachers to:

   a. Update their courses of study.
   b. Identify the technical agriculture skills they need to master.
   c. Carry out professional improvement programs.
   d. Become more knowledgeable of additional agricultural occupations.

4. Curriculum development and research.

   This publication can be useful to Departments of Agricultural Education in universities and colleges in the curriculum development and research phases of their department's activities. Students preparing to teach can use the publication for preparing occupational training programs or courses of study for schools of varying needs. Young farmer and adult farmer instruction programs can be designed with the help of this publication.

   In this publication several research methods and/or techniques were employed. Strengths and weaknesses of the research design employed in this National Study could be examined in student classes. Although the many institutions were to follow a specific procedure in making their occupational surveys, many differences can be found in the end products of their work. This publication should provide teachers and students many ideas for useful research and investigation.

D. For Colleges and Universities.

1. This report can serve as the basis for course content for short courses and conferences in agricultural occupations where there is a need.

2. The report can aid department heads in agricultural schools and colleges evaluate current courses offered as to adequacy of subject matter included in a course. Skills or competencies taught in courses as preparation for employment in an occupation can be compared to the skills and/or competencies needed in an occupation as validated nationally in this report.

E. For Production Agriculture/Agribusiness Industries.

1. This publication can be useful in preparing job specifications including experiences needed by future employees.

2. Realigning the duties and responsibilities of present employees, when needed, can be more easily made with the use of this publication.

F. For United States Census Data.

This publication should aid in the planning for and obtaining United States Census data that more clearly represents the actual work force in agriculture and agribusiness in this Nation.

G. For Student Use in Exploring Careers in Agriculture/Agribusiness.

High school students will find this publication useful in learning more about the many occupations in agriculture and agribusiness. Instead of reading a description of an occupation in general terms as most often the case, this publication provides a listing of the specific competencies or skills workers do in an occupation in a form that is easily understood by the student. Furthermore, this publication shows the student the importance of each skill or competency in the opinions of persons employed in the occupation or by their work supervisors.

The above are only a few of the uses of this report. Agricultural Educators will find the report useful in many other ways in their work in the future.

CONCLUSIONS

In recent years many changes have occurred in the agricultural and agribusiness work force in this nation. Perhaps "more specialization" can best describe these major changes which have resulted in the American farmer producing more food and fiber than he produced the year before.

This study also revealed that many production agriculture and agribusiness occupations have emerged in recent years that were unknown only a few years ago. No doubt this trend will continue.

Not often does the observer find in existing United States census data the listing of the thousands of agricultural and agribusiness workers by fitting and appropriate occupational titles. Present census procedures tend to include these workers in broad employment categories in which their identity to agriculture and agribusiness is lost. This has caused some casual observers to conclude that agriculture/agribusiness is a dying field of employment, employing fewer and fewer workers which is not the true picture.

Most employers of agricultural and agribusiness workers for occupations at mid-management or below entry levels prefer the new worker be competent in the essential agricultural competencies or skills for an occupation when they enter employment.

It is possible for many universities and colleges to focus on a problem of national concern and for each institution to complete part of the work on the problem with a minimum of supervision following a uniform procedural format. This report is evidence of this conclusion. The key to this cooperative effort has been the interest and need for the National Study shown by all institutions and states that participated in the study.

APPENDIX

Major Agriculture and Agribusiness Occupations
Surveyed as Listed by Instructional Area

PRODUCTION AGRICULTURE

The foundation of much of the economy of the United States is the production of food and fiber on our farms, ranches, vineyards, orchards and gardens. Many farms and ranches only grow crops. Other farms and ranches only produce animals or poultry, while many farms and ranches grow crops which are fed to animals and poultry produced on the farm or ranch.

In this National Study, Production Agriculture occupations were surveyed as separate distinct occupations. However, the work of most farmers and ranchers is a combination of several production agriculture occupations which are listed on the following pages.

Occupation Cluster/Occupations		Page
Beef Cattle	Cattle Ranch Foreman	17
	Assistant Cattle Ranch Foreman	20
	Cattle Ranch and Farm Hand	23
	Cowpuncher	26
	Ranch Laborer	28
	Artificial Inseminator	30
	Veterinary Assistant	32
	Feed Lot Foreman	34
	Assistant Feed Lot Foreman	37
	Cattle Buyer	40
	Feed Lot Laborer	42
	Feed Truck Driver	44
	Feed Lot Hand	45
	Veterinary Assistant	47
Dairy	Dairy Farm Manager	49
Fish	Catfish Farmer	58
Horses	Horse Production Employee	61
Poultry	Broiler Grower	64
	Poultry - Egg Producer	66
	Turkey Producer	69
Sheep	Sheep Rancher	72
	Ranch Foreman	80

Occupation Cluster/Occupations		Page
	Ranch Hand	88
	Sheep Herder	93
	Camp Tender	96
	Lamb Feeder	98
	Feed Lot Foreman	104
	Feed Lot Laborer	109
	Sheep Shearer	112
	Contract Sheep Shearer	113
Small Animals	Small Animal Supplier	116
Swine	Swine Farmer	120
Citrus	Citrus Grower	126
Corn	Corn Producers	128
Cotton	Cotton Farmer	132
Forage	Forage Producer	135
Honey	Apiculturist	139
Milo	Grain Sorghum	142
Mushrooms	Mushroom Grower	147
Nuts	Nut Producer	151
Peanuts	Peanut Farmer	153
Potatoes	Potato Producer	158
Rice	Rice Grower	165
Small Fruits	Blueberry Grower	167
	Grape Grower	167
	Raspberry Grower	167
	Strawberry Grower	167
Small Grains	Small Grain Producers	171
	Crop Producers - General	174
Soybeans	Soybean Farmer	177
Sugar Beets	Sugar Beet Farmer	181
Sweet Potatoes	Sweet Potato Farmer	184
Tobacco	Tobacco Farmer	186
Tree Fruits	Tree Fruit Grower	189
Vegetables	Vegetable Grower	195

BEEF - CATTLE RANCH FOREMAN

Job Description:

Supervise and coordinate activities of workers engaged in breeding, feeding, herding, marketing, and segregating beef breeding animals, and in construction and repair of fences, pens, buildings, and other ranch equipment. Inspects cattle, fences, buildings, equipment and feed supplies. Notes tasks to be done and assigns them to crews or individual workers. May perform other duties as assigned such as record keeping and buying and selling cattle. May be responsible for health and sanitation management.

Competencies Identified and Validated

N = 45*

Competencies	Weighted Mean**
1. Supervise workers.	3.2
a. Train workers for various jobs.	3.8
b. Observe employee compliance to safety precautions.	3.4
c. Suggest to workers improvements in methods of accomplishing work.	3.2
d. Inform employees of benefits and responsibilities under regulatory law.	2.4
2. Inspect cattle.	3.3
a. Determine cattle condition.	3.6
b. Determine the care needed for cow and calf at calving.	3.6
c. Determine care needed for replacement heifers.	3.5
d. Determine the treatment procedure for cattle diseases.	3.4
e. Determine branding, marking, castrating, dehorning, and vaccinating of cattle that is to be done.	3.4
f. Determine care needed for breeding bulls.	3.4
g. Determine quantity of feed needed.	3.3
h. Determine pasture rotation sequence.	3.2
i. Determine quality and select roughage and concentrated feeds.	3.2
j. Determine the treatment procedure for cattle parasites.	3.2

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* Responses from 45 Cattle Ranch Foremen in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

k.	Determine when to market cattle.	3.1
l.	Determine the type of cattle desired by feeders, breeders, packers, and consumers.	2.7
3.	Manage labor.	3.0
a.	Plan ranch work schedules.	3.5
b.	Determine and prepare for peak work loads.	3.4
c.	Develop harmonious relationships with workers.	3.4
d.	Determine labor requirements of the ranch.	3.1
e.	Assign workers according to skills and interests.	3.1
f.	Hire and fire ranch workers.	3.0
g.	Judge prospective employee qualifications.	3.0
h.	Negotiate specific arrangements with employees as to wages, working hours, fringe benefits, etc.	2.8
i.	Determine which regulatory laws concerning employees apply to the ranch.	2.6
j.	Develop workers' training programs.	2.4
4.	Keep records.	2.6
a.	Keep production, performance, and breeding records.	3.4
b.	Keep livestock and equipment inventories.	3.3
c.	Set up a record keeping system.	3.1
d.	Keep financial records.	2.8
e.	Determine efficiency of production.	2.8
f.	Keep personnel records.	2.7
g.	Prepare a budget.	2.7
h.	Determine rate of gain.	2.7
i.	Determine market costs.	2.5
j.	Figure per unit costs and return.	2.4
k.	Assist accountant in preparing tax returns.	2.2
l.	Execute responsibility for payroll and withholding.	2.2
m.	Figure depreciation.	1.9
n.	Determine ranch net worth.	1.7
5.	Market cattle.	3.1
a.	Cull undesirable cattle.	3.6
b.	Select desirable breeding cattle.	3.3
c.	Determine when to market cattle.	3.1
d.	Sell cattle at best market price.	2.9
e.	Evaluate current trends and prices to market or buy cattle.	2.9
f.	Buy cattle at best market prices.	2.8
6.	Manage the ranch.	2.9
a.	Schedule breeding times.	3.3
b.	Determine the number of bulls needed.	3.3

c.	Plan effective use of ranch equipment.	3.3
d.	Determine cleaning and sanitation practices for pens, sheds, and equipment.	3.2
e.	Insure timeliness of ranch operations.	3.2
f.	Determine when to use professional services.	3.2
g.	Determine the safety precautions to be observed.	3.2
h.	Determine ranch equipment needs.	3.1
i.	Plan the efficient utilization of available resources such as pasture, water, timber, etc.	3.1
j.	Plan movement of cattle for minimum shrinkage and disease control.	3.1
k.	Assist in determining long and short term goals of the ranch.	3.0
l.	Assist in planning the efficient utilization of and layout of buildings, equipment, etc.	3.0
m.	Balance cattle rations for specific purposes (lactation, show, etc.).	3.0
n.	Determine supplement feed needs and how it is to be fed.	3.0
o.	Develop plan for growing, storage, and use of feed crops.	3.0
p.	Determine cattle transportation needs.	3.0
q.	Arrange for transportation of cattle.	2.9
r.	Determine marketing practices to use.	2.7
s.	Assist in determining type and breed of cattle best suited to a situation.	2.7
t.	Determine if artificial insemination should be used.	2.6
u.	Assist in determining the type of operation best suited to the ranch (pure-bred, etc.).	2.6
v.	Determine the value of land to rent or buy.	2.2
w.	Assist in planning the ranch insurance program.	1.7

BEEF - ASSISTANT CATTLE RANCH FOREMAN

Job Description:

Assists with the supervision and coordination of workers engaged in breeding, feeding, herding, marketing, and segregating beef breeding animals, and in construction and repair of fences, pens, buildings, and other ranch equipment. Inspects cattle, fences, buildings, equipment, and feed supplies. Notes tasks to be done and assigns them to crews or individual workers. Keeps records and assists in management.

Competencies Identified and Validated

N = 42*

Competencies	Weighted Mean**
1. Supervise workers.	3.0
a. Observe employee compliance to safety precautions.	3.1
b. Suggest to workers improvements in methods of accomplishing work.	3.1
c. Train workers for various jobs.	3.0
2. Inspect cattle.	2.9
a. Determine cattle condition.	3.3
b. Assist in determining quality and in the selection of feed.	3.2
c. Determine the care needed for cow and calf at calving.	3.2
d. Assist in determining pasture rotation sequence.	3.1
e. Assist in determining branding, marking, castrating, dehorning, and vaccinating of cattle that is to be done.	3.1
f. Determine care needed for breeding bulls.	3.1
g. Determine the treatment procedure for cattle diseases.	3.0
h. Determine the treatment procedure for cattle parasites.	3.0
i. Determine care needed for replacement heifers.	3.0
j. Assist in determining the quantity of feed needed.	2.9

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* Responses from 42 Assistant Cattle Ranch Foremen in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	k.	Assist in determining when to market cattle.	2.3
	l.	Assist in determining the type of cattle to raise.	2.1
3.	Manage labor.		2.9
	a.	Develop harmonious relationships with workers.	3.3
	b.	Assign workers according to skills and interests.	3.0
	c.	Assist in planning ranch work schedule.	2.9
	d.	Assist in determining labor requirements of the ranch.	2.9
	e.	Assist in developing workers' training programs.	2.6
	f.	Judge prospective employee qualifications.	2.6
4.	Keep records.		2.4
	a.	Keep production, performance, and breeding records.	3.0
	b.	Keep expense records.	2.7
	c.	Keep livestock and equipment inventory records.	2.7
	d.	Assist in keeping personnel records.	2.6
	e.	Determine rate of gain.	2.5
	f.	Determine market costs.	2.3
	g.	Assist in preparing a budget.	2.1
	h.	Assist in figuring per unit cost and return.	2.0
	i.	Assist in figuring depreciation.	1.7
5.	Market cattle.		2.8
	a.	Evaluate current trends and prices of cattle.	3.2
	b.	Assist in culling undesirable cattle.	3.0
	c.	Assist in the selection of breeding cattle.	2.6
	d.	Assist in determining when to market cattle.	2.4
6.	Manage the ranch.		2.7
	a.	Assist in determining cleaning and sanitation practices for pens, sheds, and equipment.	3.2
	b.	Assist in determining the safety precautions to be observed.	3.1
	c.	Assist in planning effective use of ranch equipment.	3.1
	d.	Assist in determining the number of bulls needed.	3.0
	e.	Assist in insuring timeliness of ranch operations.	2.9
	f.	Assist in determining supplemental feed needs and how it is to be fed.	2.9
	g.	Plan movement of cattle for minimum shrinkage and disease control.	2.9

h.	Assist in balancing rations.	2.8
i.	Assist in scheduling breeding times.	2.8
j.	Assist in determining ranch equipment needs.	2.7
k.	Assist in determining cattle transportation needs.	2.7
l.	Assist in planning the efficient utilization of available resources, such as pasture, water, timber, etc.	2.6
m.	Arrange for transportation of cattle.	2.5
n.	Assist in developing plans for growing, storage, and use of feed crops.	2.5
o.	Assist in determining when to use professional services.	2.4
p.	Assist in determining marketing practices to use.	2.3
q.	Assist in determining the value of land to rent or buy.	1.8

BEEF - CATTLE RANCH AND FARM HAND

Job Description:

Works on a farm or ranch devoted to the raising of cattle and crops. Attends to cattle, mixes feeds and additives, feeds beef cattle, cleans and sanitizes corrals, sheds, stalls, etc. Grooms and prepares cattle for show, and maintains buildings, fences and equipment used. Prepares soil for planting. Plants, fertilizes, cultivates, and irrigates crops. Harvests, and stores feed crops raised. Operates, repairs and maintains equipment for handling cattle and growing crops.

Competencies Identified and Validated

N = 46*

Competencies	Weighted Mean**
1. Tend cattle.	3.0
a. Detect cows having calving trouble.	3.8
b. Pull calves when necessary.	3.8
c. Care for calves at calving time.	3.7
d. Detect cattle ready to calve.	3.6
e. Assist in delivery of calves.	3.6
f. Operate cattle handling equipment.	3.5
g. Detect cattle with parasites or injury.	3.5
h. Care for cattle in stalls, pens, or sheds.	3.4
i. Spray, dip, and dust cattle for parasites.	3.4
j. Detect signs of labor.	3.4
k. Move cattle from pasture to pasture or into pens.	3.3
l. Vaccinate for disease prevention.	3.2
m. Identify symptoms of disease in cattle.	3.2
n. Determine the general condition of cattle.	3.2
o. Castrate cattle.	3.1
p. Brand cattle.	3.1
q. Mark cattle using ear notches, ear tags, tattoos, and waddles.	3.1
r. Dehorn cattle.	3.1
s. Control cattle on pasture by using a horse and/or dogs.	3.1
t. Treat disease and injury of cattle.	3.1
u. Care for calves at weaning.	3.1
v. Load cattle on trucks.	3.1

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* Responses from 46 Cattle Ranch and Farm Hands in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	w.	Separate calves from cows at weaning.	3.0
	x.	Bed stalls, pens, sheds, and cattle trucks.	3.0
	y.	Detect cattle in heat.	2.9
	z.	Read brands.	2.9
	aa.	Dispose of dead animals as prescribed by law.	2.9
	bb.	Drive trucks hauling cattle.	2.7
	cc.	Rope cattle.	2.5
	dd.	Cull undesirable cows.	2.4
	ee.	Cull undesirable bulls.	2.4
	ff.	Trim the feet of cattle.	2.4
	gg.	Cast cattle with a rope.	2.2
	hh.	Apply horn weights to young bulls or cows.	2.1
	ii.	Pregnancy check cattle.	1.9
	jj.	Fit and show breeding cattle.	1.8
2.	Maintain facilities and equipment.		2.9
	a.	Repair and maintain fences.	3.4
	b.	Clean cattle pens and stalls.	3.3
	c.	Maintain cattle handling equipment.	3.3
	d.	Build fences.	3.2
	e.	Repair and maintain buildings.	3.1
	f.	Repair and maintain feeding and feed hauling equipment.	3.1
	g.	Repair and maintain feed storage equipment.	3.0
	h.	Maintain and repair tack.	2.9
	i.	Construct shelters for cattle.	2.8
	j.	Repair and maintain tractors.	2.8
	k.	Build windbreaks for cattle.	2.7
	l.	Repair, maintain, and adjust crop seeding and fertilizing equipment.	2.7
	m.	Repair and maintain soil tillage equipment.	2.6
	n.	Repair and maintain crop cultivation equipment.	2.6
	o.	Repair and maintain crop harvesting equipment.	2.6
	p.	Repair and maintain crop irrigation equipment.	2.2
	q.	Follow drawings or blueprints in constructing buildings and equipment.	2.1
3.	Feed cattle.		2.9
	a.	Provide proper amount and quality of water.	3.4
	b.	Read and understand ingredients on a feed tag.	3.4
	c.	Operate feed loading and moving equipment.	3.2
	d.	Provide proper minerals for cattle.	3.2
	e.	Place feed in feed bunks using hand and power equipment.	3.1
	f.	Mix feeds for cattle.	2.9
	g.	Identify nutrient deficiencies in cattle.	2.6
	h.	Determine quality of feeds.	2.6
	i.	Determine pasture quality and amount.	2.6
	j.	Set up and provide creep feeding.	2.5
	k.	Determine feed needs of cattle.	2.3

4.	Keep records.	2.1
	a. Use scales and record obtained weights of crops and cattle.	2.7
	b. Keep cattle breeding records.	2.2
	c. Keep cattle feeding records.	2.2
	d. Keep cattle production records.	2.0
	e. Keep cattle and crop expense records.	1.8
	f. Keep crop production records.	1.7
5.	Produce feed.	2.8
	a. Plant grain and hay crops.	3.1
	b. Apply fertilizers.	3.1
	c. Bale forage crops.	3.1
	d. Plow crop land.	3.0
	e. Till soil to prepare for seeding.	3.0
	f. Haul and store crop.	3.0
	g. Cultivate crops for soil tilth and weed control.	2.9
	h. Apply weed control chemicals.	2.8
	i. Apply chemicals to control weeds and pests of crops.	2.8
	j. Cut silage for feed.	2.8
	k. Cut forage crops.	2.8
	l. Combine grains.	2.7
	m. Irrigate crops.	2.6
	n. Mark fields for irrigation.	2.1
6.	Perform other duties.	2.5
	a. Read pesticide labels and directions for use.	3.3
	b. Read vaccine and medicine labels and directions for use.	3.3
	c. Read seed labels and directions for planting rate.	2.9
	d. Store vaccines and medications.	2.7
	e. Store fertilizers.	2.4
	f. Store pesticides.	2.3
	g. Plant windbreaks for cattle.	1.7
	h. Butcher and cut up beef for ranch use.	1.3

BEEF - COWPUNCHER

Job Description:

Attends to beef cattle on stock ranch. Rides horse to drive cattle in desired direction and to round up stray cattle. Castrates, vaccinates, and brands cattle. Inspects fences from horseback or motor vehicle and repairs them. Rides over the range to search for cattle. Feeds cattle during cold weather. Rounds up horses on open range. Breaks horses and trains them for saddle. Repairs and maintains equipment for feeding and watering cattle.

Competencies Identified and Validated

N = 42*

Competencies		Weighted Mean**
1.	Tend cattle.	3.2
a.	Detect cattle ready to calve.	3.8
b.	Assist in delivery of calves.	3.7
c.	Pull calves when necessary.	3.7
d.	Detect cows having calving trouble.	3.7
e.	Dehorn cattle.	3.6
f.	Control cattle on the range using a horse and dogs.	3.5
g.	Move cattle on the range.	3.5
h.	Care for calves at calving time.	3.5
i.	Round-up cattle.	3.5
j.	Determine the general condition of cattle.	3.4
k.	Detect cattle with parasites or injury.	3.4
l.	Detect signs of labor.	3.4
m.	Brand cattle.	3.3
n.	Mark cattle using ear notches, ear tags, tattoos, and waddles.	3.3
o.	Vaccinate cattle for disease control.	3.3
p.	Identify symptoms of disease in cattle.	3.3
q.	Treat disease and injury of cattle.	3.3
r.	Separate calves from cows at weaning time.	3.3
s.	Read brands.	3.3
t.	Operate cattle handling equipment.	3.3
u.	Castrate cattle.	3.2
v.	Spray, dip, and dust cattle for parasites.	3.2
w.	Care for calves at weaning.	3.2
x.	Detect cattle in heat.	3.1

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* Responses from 42 Cowpunchers in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

y.	Rope cattle.	3.1
z.	Load cattle on trucks.	3.0
aa.	Cast cattle with a rope.	2.9
bb.	Dispose of dead animals as prescribed by law.	2.8
cc.	Drive trucks loaded with cattle.	2.6
dd.	Trim feet of cattle.	2.3
ee.	Apply horn weights to young cows and bulls.	2.2
2.	Maintain facilities and equipment.	3.1
a.	Maintain windmills and springs for water.	3.4
b.	Ride fences to detect repairs needed.	3.3
c.	Repair fences.	3.3
d.	Maintain cattle handling equipment.	3.1
e.	Maintain and repair saddles and other tack.	3.1
f.	Repair and maintain corrals.	3.0
g.	Construct fences.	3.0
h.	Maintain cattle feeding equipment.	3.0
i.	Construct corrals.	2.9
j.	Construct shelters for cattle.	2.5
3.	Feed cattle.	2.9
a.	Feed supplemental roughage and protein during the winter.	3.3
b.	Distribute mineral blocks on the range.	3.2
c.	Provide for proper amount and quality of water.	3.2
d.	Operate feeding and feed handling equipment.	3.1
e.	Determine pasture quantity and quality.	3.0
f.	Identify nutrient deficiencies in cattle.	2.7
g.	Determine when to start winter feeding.	2.6
h.	Pack mineral blocks on horses.	2.5
i.	Determine supplemental feed needed.	2.5
4.	Train and care for horses.	2.7
a.	Provide proper feed and water for horses.	3.4
b.	Detect and treat injury to horses.	3.2
c.	Determine general condition of horses.	3.1
d.	Detect and treat horses for parasites.	3.0
e.	Detect and treat diseases of horses.	3.0
f.	Haul horses in truck or trailer.	2.9
g.	Train horses for roping.	2.8
h.	Halter break horses.	2.8
i.	Drive horses.	2.8
j.	Round-up horses.	2.7
k.	Break horses to saddle.	2.7
l.	Train horses to rein.	2.7
m.	Rope horses.	2.5
n.	Shoe horses.	2.4
o.	Train horses for packing.	2.2
p.	Brand horses.	2.1
q.	Castrate stallions.	1.7

BEEF - RANCH LABORER

Job Description:

Participates in branding, dehorning, and castrating. Herds animals to pens and pastures. Applies prescribed medications. Digs post holes by hand, repairs fences and buildings using hand tools, pulls weeds by hand, removes trash and dirt from watering places. Mixes feed by hand. May ride horseback to assist in herding. Does not operate mobile or stationary power-driven equipment.

Competencies Identified and Validated

N = 41*

Competencies		Weighted Mean**
1.	Tend cattle.	3.2
a.	Assist with calving.	3.4
b.	Assist with branding and marking cattle.	3.3
c.	Assist with castrating cattle.	3.2
d.	Assist with dehorning cattle.	3.2
e.	Assist with herding cattle. May ride horseback.	3.2
f.	Fill water troughs where power equipment is not required.	3.2
g.	Assist with treatment and medication of cattle.	3.2
h.	Assist with loading and unloading cattle.	3.2
i.	Operate cattle handling equipment that is not powered.	3.1
2.	Maintain facilities and equipment.	3.4
a.	Assist with construction of fences.	3.9
b.	Maintain fences.	3.5
c.	Clean pens, stalls, and shelters by hand.	3.3
d.	Maintain pens, stalls and shelters using hand tools.	3.3
e.	Assist with the construction of pens, stalls, and shelters using hand tools.	3.3
f.	Clean watering places by hand.	3.2
g.	Clean equipment using hand scraper, water, and brushes or rags.	3.1

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* Responses from 41 Ranch Laborers in 21 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Handle crops, feeds and bedding.	3.0
a.	Feed cattle where power equipment is not required.	3.4
b.	Load, unload, and stack bales of hay or straw by hand.	3.2
c.	Bed cattle pens and shelters by applying bedding by hand.	3.1
d.	Bed trucks for hauling cattle by hand.	3.1
e.	Handle feed by using hand tools.	3.0
f.	Mix feed by hand using a specified formula.	3.0
g.	Clean ditch with a shovel or spade.	2.9
h.	Irrigate using a shovel or spade.	2.7
i.	Weed crops with a hoe or by pulling weeds by hand.	2.4

BEEF - ARTIFICIAL INSEMINATOR

Job Description:

Stores and handles semen and inseminates prepared semen into the reproductive tract of cows. Observes animals for heat, restrains eligible cattle observed in heat, selects and inseminates with proper semen using proper techniques and sanitation, maintains pertinent records, (cow, semen, date, etc.).

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Handle cattle.	3.7
a.	Detect cattle in heat.	3.8
b.	Determine best time to inseminate.	3.8
c.	Maintain breeding records.	3.7
d.	Move cattle gently to and from breeding chute.	3.6
e.	Operate breeding chute.	3.6
f.	Identify symptoms of reproductive diseases in cattle.	3.5
2.	Handle semen.	3.8
a.	Maintain clean sanitary equipment.	3.9
b.	Remove semen from storage without exposing remaining semen to elevated temperatures.	3.9
c.	Protect semen and insemination equipment from adverse environment (sun, heat, cold, wind, etc.).	3.9
d.	Maintain semen storage and handling equipment.	3.8
e.	Thaw semen.	3.8
f.	Fill pipette or straw insemination gun.	3.8
g.	Handle semen frozen in straws and ampules.	3.8
h.	Transfer semen from central storage when receiving semen.	3.6
3.	Inseminate cows.	3.8
a.	Identify the reproductive tract by pre-rectal palpation and locate cervix quickly.	3.9

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* Responses from 37 Artificial Inseminators in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Insert pipette into the vagina quickly and cleanly and pass it through the cervix.	3.9
c.	Deposit semen into the body of the uterus with proper penetration.	3.8
d.	Deposit semen with proper speed.	3.7
e.	Sanitize external genital organs.	3.6

BEEF - VETERINARY ASSISTANT

Job Description:

Cares for cattle under treatment in hospital pens and shelters for disease and injury. Rides pens and pastures on horseback and detects sick and injured cattle. Drives cattle to and from hospital, operates cattle restraining equipment. Keeps hospital equipment and facilities clean and disinfected and sterilizes equipment. Administers medications and treatment under the direction of the veterinarian. Performs duties such as vaccination, castration, dehorning, and marking, using various methods. Keeps and maintains records of vaccinations, disease, and treatments.

Competencies Identified and Validated

N = 35*

Competencies		Weighted Mean**
1.	Care for and treat cattle.	3.4
a.	Identify symptoms of disease and injury.	3.9
b.	Vaccinate cattle for disease control.	3.8
c.	Give medications with syringe or hypodermic needle.	3.7
d.	Give medications to cattle orally, using the proper equipment.	3.7
e.	Apply medication to injuries.	3.7
f.	Assist veterinarian in surgery.	3.7
g.	Castrate cattle.	3.6
h.	Detect diseased or injured animals.	3.6
i.	Provide proper feed and water for cattle in hospital.	3.5
j.	Give medication to cattle through feed and water.	3.5
k.	Dehorn cattle.	3.4
l.	Clip hair on animals to prepare for surgery or to read identification marks.	3.3
m.	Implant cattle with growth stimulants.	3.3
n.	Mark cattle by branding, ear marking, and ear tagging.	3.2
o.	Spray, dip, and dust cattle.	3.1
p.	Ride horse through pens and pastures.	3.0
q.	Properly dispose of cattle that have died.	2.9
r.	Move cattle to and from pens, pastures, and hospital.	2.8

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* Responses from 35 Veterinary Assistants in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.		Care for and use facilities and equipment.	3.3
	a.	Clean, disinfect, and sanitize equipment.	3.8
	b.	Identify common medical equipment.	3.7
	c.	Clean and disinfect hospital shelters and pens.	3.5
	d.	Maintain cattle handling and medical equipment.	3.4
	e.	Maintain hospital pens and shelters.	3.3
	f.	Operate cattle restraining equipment.	3.3
	g.	Develop hospital pens and shelters.	3.0
	h.	Operate scales to determine weight.	2.6
3.		Keep records.	3.6
	a.	Keep records of vaccinations.	3.9
	b.	Keep records of disease treatment.	3.8
	c.	Keep records of injuries.	3.6
	d.	Keep records of cattle death loss.	3.6
	e.	Keep records of costs involved in prevention, treatment, and control of disease and injury to cattle.	3.2
4.		Buy and care for medicants.	3.5
	a.	Read directions on vaccines and medicants.	3.9
	b.	Read and understand cattle medical terminology.	3.7
	c.	Dispose of empty vaccine and medicine containers.	3.4
	d.	Buy and maintain stock of vaccines, medicants, supplies, and equipment needed.	3.2

BEEF - FEED LOT FOREMAN

Job Description:

Supervise and coordinate activities of workers engaged in feeding, caring for, and segregating feed lot cattle and in construction and repair of pens, shelters and other feed lot equipment. Inspects cattle, pens, shelters, equipment and feed supplies. Notes tasks to be done and assigns them to crews or individual workers. May perform other duties as assigned, such as record keeping and buying and selling feed lot cattle. May be responsible for health and sanitation management.

Competencies Identified and Validated

N = 35*

Competencies		Weighted Mean**
1.	Supervise workers.	3.2
	a. Suggest improvements in methods of accomplishing work to workers.	3.5
	b. Observe employee compliance to safety precautions.	3.3
	c. Train workers for various jobs.	3.2
	d. Inform employees of benefits and responsibilities under regulatory laws.	2.9
2.	Inspect cattle.	3.3
	a. Determine cattle condition.	3.9
	b. Determine care needed for feed lot cattle.	3.7
	c. Determine quality of feeds.	3.6
	d. Determine branding, marking, castrating, dehorning and vaccinating that is to be done.	3.4
	e. Select feeds for feed lot cattle.	3.2
	f. Determine treatment procedure for cattle diseases.	3.2
	g. Determine treatment procedure for cattle parasites.	3.1
	h. Determine hormones and/or growth stimulants to be used.	3.1
	i. Determine when to market cattle.	3.1
	j. Determine the type of cattle desired by packers and consumers.	2.9
	k. Determine when to buy cattle.	2.7

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* Responses from 35 Feed Lot Foremen in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Manage labor.	3.3
a.	Plan feed lot work schedule.	3.7
b.	Judge prospective employee qualifications.	3.5
c.	Develop harmonious relationships with workers.	3.4
d.	Determine labor requirements for the feed lot.	3.4
e.	Determine labor needed and prepare for peak work loads.	3.4
f.	Hire and fire feed lot workers.	3.3
g.	Assign workers according to skills and interests.	3.2
h.	Develop workers' training programs.	3.1
i.	Determine which regulatory laws, concerning employees, apply to the operation.	3.0
j.	Negotiate specific arrangements with employees as to wages, working hours, fringe benefits, etc.	2.9
4.	Keep records.	2.7
a.	Keep livestock and equipment inventories.	3.4
b.	Set up a record keeping system.	3.2
c.	Keep personnel records.	3.2
d.	Keep production records.	3.0
e.	Keep financial records.	2.9
f.	Prepare operation budget.	2.8
g.	Determine market costs.	2.8
h.	Determine rate of gain.	2.8
i.	Determine feed lot net worth.	2.4
j.	Prepare per unit costs and return.	2.4
k.	Execute responsibility for payroll and withholding.	2.4
l.	Assist accountant in preparing tax returns.	2.3
m.	Determine efficiency of production.	2.1
n.	Figure depreciation.	2.1
5.	Market cattle.	2.8
a.	Determine when to market cattle.	2.9
b.	Sell cattle at best market price.	2.8
c.	Buy feed at best price.	2.8
d.	Evaluate current trends and prices to market or buy cattle.	2.7
e.	Select desirable feeder cattle.	2.7
f.	Buy feeder cattle at best market price.	2.4
6.	Manage the feed lot.	3.0
a.	Determine cleaning and sanitation requirements for the feed lot.	4.0
b.	Plan effective use of equipment.	3.6
c.	Determine feed lot equipment needs.	3.6
d.	Insure timeliness of operations.	3.6

e.	Assist in planning the efficient utilization of and layout of pens and shelters.	3.5
f.	Assist in determining the best type of feeding program.	3.4
g.	Determine when to use professional services.	3.4
h.	Plan efficient utilization of feed, water and storage facilities.	3.4
i.	Determine safety precautions to be observed.	3.4
j.	Assist in determining long and short term goals of the operation.	3.2
k.	Plan transportation of cattle for minimum weight loss and disease control.	3.2
l.	Determine marketing practices to use.	2.9
m.	Develop plans for growing and storing feed crops.	2.9
n.	Arrange for transportation of cattle.	2.8
o.	Determine cattle transportation needs.	2.7
p.	Assist in planning the feed lot insurance program.	2.7
q.	Balance rations for cattle on feed.	2.7

BEEF - ASSISTANT FEED LOT FOREMAN

Job Description:

Assists with the supervision and coordination of activities of workers engaged in feeding, caring for, and segregating feed lot cattle, and in constructing and repairing of pens, shelters, and other feed lot equipment. Inspects cattle, pens, shelters, equipment and feed supplies. Notes tasks to be done, and assigns them to crews or individual workers. Keeps records as assigned, and assists in management.

Competencies Identified and Validated

N = 35*

Competencies		Weighted Mean**
1.	Supervise workers.	3.3
a.	Train workers for various jobs.	3.4
b.	Suggest improvements in methods of accomplishing work to workers.	3.3
c.	Observe employee compliance to safety precautions.	3.2
2.	Inspect cattle.	2.9
a.	Determine cattle condition.	3.6
b.	Assist in determining care needed for feed lot cattle.	3.5
c.	Assist in determining branding, marking, castrating, dehorning and vaccinating to be done.	3.3
d.	Determines treatment procedure for cattle parasites.	3.2
e.	Assist in determining quality of feed.	3.1
f.	Determine treatment procedure for cattle diseases.	3.1
g.	Assist in determining implant use of hormone and growth stimulants.	3.0
h.	Assist in selection of feeds.	2.7
i.	Assist in determining when to market cattle.	2.3
j.	Assist in determining the type of cattle to be fed.	2.0
3.	Manage labor.	3.4
a.	Assist in developing workers' training plans.	3.6

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* Responses from 35 Assistant Feed Lot Foremen in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Develop harmonious relationships with workers.	3.5
	c.	Assist in planning feed lot work schedule.	3.4
	d.	Assign workers according to skills and abilities.	3.4
	e.	Assist in determining labor requirements for the feed lot.	3.3
	f.	Judge prospective employee qualifications.	3.0
4.	Keep records.		2.7
	a.	Keep production records.	3.1
	b.	Keep livestock and equipment inventory records.	3.0
	c.	Assist in determining efficiency of production.	2.8
	d.	Determine rate of gain.	2.7
	e.	Assist in keeping personnel records.	2.6
	f.	Assist in preparing operation budget.	2.3
	g.	Assist in preparing per unit costs and return.	2.1
	h.	Keep financial records.	2.1
	i.	Assist in determining market costs.	2.0
	j.	Assist in figuring depreciation.	1.7
5.	Market cattle.		2.0
	a.	Assist in determining when to market cattle.	2.2
	b.	Buy feed at best price.	2.2
	c.	Evaluate current trends and prices to market or buy cattle.	2.0
	d.	Assist in selling cattle.	2.0
	e.	Assist in the selection of desirable feeder cattle.	1.9
	f.	Assist in buying feed lot cattle.	1.6
6.	Manage the feed lot.		2.8
	a.	Determine cleaning and sanitation requirements for the feed lot.	3.3
	b.	Assist in determining feed lot equipment needs.	3.3
	c.	Insure timeliness of operations.	3.3
	d.	Assist in planning efficient utilization of pens and shelters.	3.3
	e.	Assist in determining safety precautions to be observed.	3.3
	f.	Assist in planning effective use of equipment.	3.3
	g.	Assist in determining when to use professional services.	3.2
	h.	Assist in planning efficient use of feed, water, and storage.	3.1
	i.	Plan transportation of cattle for minimum weight loss and disease control.	2.5

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j.	Arrange for transportation of cattle.	2.3
k.	Assist in determining cattle transportation needs.	2.3
l.	Assist in determining market practices to use.	2.2
m.	Assist in developing plans for growing and storing feed crops.	2.2
n.	Assist in balancing rations for cattle on feed.	2.1

BEEF - CATTLE BUYER

Job Description:

Purchases cattle from yards and individual cattle raisers to be fed out or for resale to packers. Inspects, grades, and calculates weight of livestock to determine value and yield. Purchases cattle according to authorization or prospect for resale. Contacts carriers to arrange for transportation of cattle to feed lot or other destination. Sells stock to packing houses or other purchasers. Keeps purchasing and selling records.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Purchase and sell cattle.	3.3
a.	Locate cattle for purchase.	3.9
b.	Apply available market information to buy and sell cattle.	3.9
c.	Establish and maintain effective working relationships with cattle brokers, sale barns, commission agencies, private cattle producers, and packing houses.	3.9
d.	Purchase and sell cattle of specific grade.	3.8
e.	Purchase and sell cattle of specific weight.	3.8
f.	Negotiate for the purchase or sale of cattle within a set price structure.	3.8
g.	Arrange for bills-of-sale.	3.7
h.	Determine transportation needs for cattle.	3.6
i.	Determine cattle shipping costs.	3.6
j.	Arrange for transportation of cattle.	3.5
k.	Arrange for health certificates.	3.5
l.	Arrange for brand inspections.	2.7
m.	Understand auctioneers and bid on cattle at sale yard.	2.5
n.	Load cattle on trucks.	2.4
o.	Drive trucks loaded with cattle.	1.2
2.	Inspect cattle.	3.7
a.	Determine general condition of cattle.	3.9
b.	Identify symptoms of disease in cattle.	3.9
c.	Identify injuries on cattle.	3.9
d.	Determine the weight of cattle.	3.9

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* Responses from 37 Cattle Buyers in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	e.	Determine grades of cattle.	3.8
	f.	Identify symptoms of parasites in cattle.	3.7
	g.	Determine estimated yield of cattle.	3.7
	h.	Identify symptoms of nutrient deficiency in cattle.	3.2
	i.	Read brands on cattle.	2.8
3.	Keep records.		3.3
	a.	Keep purchase records.	3.8
	b.	Keep sales records.	3.8
	c.	Keep transportation cost records.	3.0
	d.	Keep brand inspection records.	2.6
	e.	Keep health certificate records.	2.5

BEEF - FEED LOT LABORER

Job Description:

Tends cattle and feed crops, participates in marking, dehorning, and castrating cattle, herds cattle to and from pens, may apply prescribed medication, digs post holes by hand, pulls weeds by hand or chops weeds with a hoe; cleans pens and shelters using hand tools, does cattle feeding not requiring the use of power equipment, handles feed using scoop shovel, stacks and loads bales of hay or bedding by hand. Does not operate mobile or stationary power-driven equipment.

Competencies Identified and Validated

N = 33*

Competencies	Weighted Mean**
1. Tend cattle.	3.0
a. Assist with herding cattle between various pens.	3.1
b. Operate cattle handling equipment that is not powered.	3.1
c. Fill water troughs where power equipment is not required.	3.1
d. Assist with loading and unloading cattle.	3.1
e. Assist with branding and marking cattle.	3.0
f. Assist with dehorning cattle.	3.0
g. Assist with castrating cattle.	2.9
h. Assist with treatment and medication of cattle.	2.9
2. Maintain facilities and equipment.	3.1
a. Clean watering places by hand.	3.4
b. Clean feed troughs by hand.	3.4
c. Maintain shelters and pens using hand tools.	3.3
d. Clean equipment using hand scraper, water, brush and rags.	3.3
e. Clean shelters and pens by hand.	3.0
f. Assist in construction of cattle pens and shelters.	3.0
g. Clean silos and silage pits by hand.	3.0
h. Clean mineral feeders by hand.	2.8

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* Responses from 33 Feed Lot Laborers in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Handle crops, feeds, and bedding.	2.7
a.	Feed cattle where hand labor is required.	3.4
b.	Load and unload bales of hay or bedding by hand.	2.9
c.	Stack hay and bedding using a fork or by moving bales by hand.	2.9
d.	Bed cattle shelters and pens by hand.	2.9
e.	Use shovel or spade to clean ditches.	2.7
f.	Bed trucks for hauling cattle by hand.	2.6
g.	Load feed grains and unload feed grains using scoop shovel.	2.5
h.	Mix feed by hand using specified formula.	2.4
i.	Load and unload silage by hand.	2.4
j.	Use shovel or spade to irrigate.	2.3
k.	Weed crops with a hoe or by hand.	2.1

BEEF - FEED TRUCK DRIVER

Job Description:

Drives a special feed hauling truck in transporting prepared feed to cattle pen feeding bunks as assigned. Unloads truck with the power driven mechanism and distributes feed in feed bunks. Performs maintenance on the truck such as lubrication, changing oil, and does minor repair such as replacing light bulbs, fuses, and changing tires. Keeps trucks clean. Inspects the truck for proper operation and safety.

Competencies Identified and Validated

N = 35*

Competencies	Weighted Mean**
1. Drive and load truck.	3.8
a. Drive gas or diesel truck.	3.8
b. Operate unloading mechanism.	3.8
c. Distribute feed in feed bunks.	3.8
d. Position truck for loading feed.	3.8
2. Inspect and maintain truck.	3.6
a. Check oil, change according to schedule.	3.8
b. Fill truck with fuel, service fuel filter.	3.8
c. Check oil, change according to schedule.	3.7
d. Check coolant, service when needed.	3.7
e. Check water level in battery, add water when needed.	3.7
f. Maintain truck in safe operating condition.	3.7
g. Lubricate truck and unloading mechanism according to schedule.	3.6
h. Check brakes, service when needed.	3.6
i. Check lights and other electrical devices; replace bulbs and fuses when needed.	3.5
j. Check tires, change them when needed.	3.4
3. Keep records.	3.4
a. Keep records of pens fed.	3.6
b. Operate scales and record weights of feed.	3.6
c. Keep records of feed hauled.	3.5
d. Keep records of truck repairs.	3.1
e. Keep records of truck maintenance.	3.0

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* Responses from 35 Feed Truck Drivers in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

BEEF - FEED LOT HAND

Job Description:

Attends feedlot cattle. Mixes feeds and additives, fills feed troughs with grain and roughage and fills water troughs. Drives livestock to and from various pens, examines cattle to detect disease and injury. Vaccinates, castrates, dehorns, and marks cattle. Applies medications and treats diseases and injury. Sprays, dusts, and dips cattle; operates cattle restraining equipment, cleans and sanitizes pens and shelters. Maintains buildings, pens, and equipment. Plants, cultivates, harvests, and stores feed grains and roughages. Maintains production and cost records.

Competencies Identified and Validated

N = 36*

Competencies	Weighted Mean**
1. Tend cattle.	3.2
a. Identify injuries on cattle.	3.5
b. Apply medicants by using syringe.	3.5
c. Dehorn cattle.	3.4
d. Mark cattle by using paint and chalk, by using ear tags and ear notches.	3.4
e. Control movement of cattle between the various pens.	3.4
f. Apply medicants in feed and water.	3.4
g. Identify symptoms of diseases in cattle.	3.4
h. Spray, dust, and dip cattle.	3.4
i. Load cattle on trucks.	3.4
j. Implant cattle with growth stimulants.	3.4
k. Bed cattle shelters, pens, and trucks.	3.3
l. Treat disease and injury of cattle.	3.3
m. Dispose of dead animals as prescribed by law.	3.3
n. Castrate cattle.	3.2
o. Brand cattle.	3.2
p. Determine general condition of cattle.	3.2
q. Identify symptoms of parasites in cattle.	3.0
r. Identify symptoms of nutrient deficiency.	2.7
s. Separate cattle according to size and weight.	2.7
t. Drive trucks loaded with cattle.	2.3
u. Fit and show market cattle.	1.7

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* Responses from 35 Feed Lot Hands in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.	Feed cattle.		3.0
	a.	Fill feed troughs with mechanical equipment.	3.4
	b.	Provide proper amount and quality of water.	3.4
	c.	Operate feed loading and moving equipment.	3.4
	d.	Operate grinding, chopping and mixing equipment for feed.	3.3
	e.	Mix feeds and additives.	3.1
	f.	Read and understand ingredient composition of feeds as shown on feed tags.	2.8
	g.	Provide proper minerals for cattle.	2.8
	h.	Balance rations for efficient gain.	1.8
3.	Maintain facilities and equipment.		3.0
	a.	Repair and maintain cattle handling equipment.	3.4
	b.	Maintain pens and shelters.	3.4
	c.	Clean cattle pens and shelters.	3.3
	d.	Maintain feeding equipment.	3.1
	e.	Construct cattle pens and shelters.	3.0
	f.	Maintain feed storage equipment.	2.8
	g.	Maintain equipment for growing feed crops.	2.6
	h.	Follow drawings and blue prints in constructing buildings and equipment.	2.0
4.	Keep records.		2.0
	a.	Keep feed and feeding records.	2.7
	b.	Use scales and record weights of cattle and feeds.	2.4
	c.	Keep cattle gain records.	1.8
	d.	Keep production records.	1.7
	e.	Keep expense records.	1.6
5.	Produce feed.		2.4
	a.	Harvest feed crops.	2.5
	b.	Store feed crops.	2.5
	c.	Cultivate feed crops.	2.4
	d.	Fertilize feed crops.	2.4
	e.	Plant feed crops.	2.3
	f.	Irrigate feed crops.	2.2
6.	Perform other duties.		2.6
	a.	Read and understand vaccine and medicine labels and directions for use.	3.3
	b.	Read pesticide labels and directions for use.	3.2
	c.	Store vaccines and medications.	3.0
	d.	Store pesticides.	2.7
	e.	Butcher and cut-up beef.	0.8

BEEF - VETERINARY ASSISTANT

Job Description:

Cares for cattle under treatment in hospital pens and shelters for disease and injury. Rides pens and pastures on horseback and detects sick and injured cattle. Drives cattle to and from hospital, operates cattle restraining equipment. Keeps hospital equipment and facilities clean and disinfected and sterilizes equipment. Administers medications and treatment under the direction of the veterinarian. Performs duties such as vaccination, castration, dehorning, and marking, using various methods. Keeps and maintains records of vaccinations, disease, and treatments.

Competencies Identified and Validated

N = 39*

Competencies		Weighted Mean**
1.	Care for and treat cattle.	3.4
a.	Give medications to cattle orally, using the proper equipment.	3.8
b.	Vaccinate cattle for disease control.	3.7
c.	Provide proper feed and water for cattle in hospital.	3.7
d.	Give medications with syringe or hypodermic needle.	3.7
e.	Apply medication to injuries.	3.7
f.	Detect diseased or injured animals.	3.7
g.	Castrate cattle.	3.6
h.	Give medication to cattle through feed and water.	3.6
i.	Identify symptoms of disease and injury.	3.5
j.	Mark cattle by branding, ear marking, and ear tagging.	3.4
k.	Assist veterinarian in surgery.	3.4
l.	Dehorn cattle.	3.3
m.	Clip hair on animals to prepare for surgery or to read identification marks.	3.3
n.	Properly dispose of cattle that have died.	3.2
o.	Move cattle to and from pens, pastures, and hospital.	3.1
p.	Implant cattle with growth stimulant.	3.1

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* Responses from 39 veterinary assistants in 18 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	q.	Spray, dip, and dust cattle.	3.0
	r.	Ride horse through pens and pastures.	2.8
2.		Care for and use facilities and equipment.	3.4
	a.	Clean, disinfect, and sanitize equipment.	3.7
	b.	Clean and disinfect hospital shelters and pens.	3.5
	c.	Identify common medical equipment.	3.5
	d.	Maintain cattle handling and medical equipment.	3.4
	e.	Operate cattle restraining equipment.	3.4
	f.	Maintain hospital pens and shelters.	3.2
	g.	Develop hospital pens and shelters.	3.0
	h.	Operate scales to determine weight.	3.0
3.		Keep records.	3.5
	a.	Keep records of vaccinations.	3.7
	b.	Keep records of disease treatment.	3.6
	c.	Keep records of injuries.	3.5
	d.	Keep records of cattle death loss.	3.3
	e.	Keep records of costs involved in prevention, treatment, and control of disease and injury to cattle.	3.2
4.		Buy and care for medicants.	3.6
	a.	Read directions on vaccines and medicants.	3.9
	b.	Read and understand cattle medical terminology.	3.6
	c.	Dispose of empty vaccine and medicine containers.	3.6
	d.	Buy and maintain stock of vaccines, medicants, supplies, and equipment needed.	3.3

DAIRY FARM MANAGER

Other Titles: Dairy Farmer, Farmer, Dairyman.

Job Description:

The Dairy Farm Manager provides labor and management skills and combines personal abilities with those of others to produce milk efficiently and economically. A person in this occupation must provide and combine skills, technical knowledge, and management to make a profitable dairy production unit. Many dairymen work and manage the home farm on which the family provides most if not all of the labor and management. Other dairy production units are larger and help is employed to provide labor and/or management. Examples of the type of work and management decisions dairy farm unit managers perform are: combining labor, management, land, and capital into a productive unit; deciding which enterprises and the size of enterprise to have; selecting, breeding, feeding, managing, housing, and caring for dairy animals; and producing or purchasing feed for the dairy herd. They must decide where and how to market the production from the herd.

Competencies Identified and Validated

N = 56*

Competencies			Weighted Mean**
1.	Keep records.		3.6
	a.	Maintain breeding records.	3.8
	b.	Maintain an adequate system of ear tagging, tattooing, etc. for identification purposes.	3.8
	c.	Keep, analyze, and use production records.	3.7
	d.	Keep dairy enterprise records and analyze entire dairy operation at least annually.	3.7
	e.	Keep health records.	3.4
	f.	Prepare accurate breed registration application forms.	3.2
2.	Follow correct milking procedures.		3.6
	a.	Practice gentle handling of cows.	3.8
	b.	Stimulate cows correctly for proper milk letdown.	3.7
	c.	Follow an efficient and regular milking routine.	3.7

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* Responses from 56 Dairy Farm Managers in 12 states. Survey conducted by the Division of Agricultural Education, University of Minnesota, St. Paul, Minnesota 55071.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	d.	Recognize problems of over and under milking.	3.7
	e.	Break heifers in properly.	3.5
	f.	Milk rapidly.	3.4
	g.	Avoid the unusual at milking time.	3.3
3.		Maintain milking system in good condition.	3.4
	a.	Use milking equipment properly.	3.6
	b.	Check vacuum system and keep operating at correct level.	3.6
	c.	Keep teat inflations in proper conditions.	3.6
	d.	Use proper cleaning and sanitizing techniques.	3.6
	e.	Follow recommended maintenance programs.	3.4
	f.	Know how a milking machine works.	3.4
	g.	Analyze different chemicals for their effectiveness in cleaning and sanitizing.	2.8
4.		Keep mastitis losses to a minimum.	3.2
	a.	Correct situations which cause mastitis to occur.	3.8
	b.	Identify mastitis problems and treat mastitic cows.	3.7
	c.	Use a teat-dipping program to lessen new incidence of mastitis.	3.4
	d.	Use C.M.T. or W.M.T. to identify mastitis problems.	3.0
	e.	Milk cows in order-mastitic cows last.	2.9
	f.	Estimate losses due to mastitis.	2.8
	g.	Use strip cup to spot abnormal milk.	2.8
	h.	Use suitable dry cow treatment. #	
5.		Minimize calf losses by following recommended herd health practices.	3.5
	a.	Recognize possible calving disorders.	3.7
	b.	Assist calf if necessary.	3.6
	c.	Follow sanitation program.	3.5
	d.	Prepare cow and facilities for parturition.	3.5
	e.	Assist cow when calving.	3.3
6.		Identify animals with a health problem.	3.0
	a.	Determine when to call veterinarian.	3.7
	b.	Recognize symptoms of sick animals.	3.7
	c.	Take animal's temperature if illness is suspected.	3.5
	d.	Keep health record on animals.	3.4
	e.	Know common cattle diseases: causes, treatment, and prevention.	3.3
	f.	Identify common parasites.	3.3

# Not included on questionnaire but recommended by some experts surveyed.

7.	Treat animals with a health problem.	3.3
a.	Use antibiotics and medications correctly in treating minor health problems.	3.5
b.	Vaccinate, drench, spray, dust, or treat animals as directed by veterinarian.	3.5
c.	Use proper parasite control methods.	3.3
d.	Maintain equipment and health supply inventory.	3.1
8.	Follow programs to reduce or eliminate health problems.	3.1
a.	Follow recommended sanitation practices.	3.5
b.	Follow recommended vaccination program.	3.5
c.	Dehorn calves.	3.3
d.	Dip navels of baby calves in iodine.	3.3
e.	Select and use correct disinfectants as needed.	3.1
f.	Maintain an insect control program.	3.1
g.	Trim animals' feet when necessary.	3.0
h.	Remove extra teats from heifers.	3.0
i.	Clip the underline, udder, and rear flank of cows in production.	2.5
9.	Utilize basic principles of nutrition.	3.4
a.	Provide an adequate water supply.	3.8
b.	Balance ration based on nutrient needs.	3.7
c.	Determine nutritional requirements of growth.	3.4
d.	Determine nutritional requirements of production.	3.4
e.	Determine nutritional requirements of maintenance.	3.4
f.	Determine nutritional requirements of reproduction.	3.3
g.	Determine effect of environment on nutritional requirements.	3.1
10.	Use modern technology to determine least cost and most profitable rations.	3.3
a.	Determine most profitable summer forage program.	3.5
b.	Use home grown grains wisely.	3.5
c.	Make efficient use of forage.	3.4
d.	Select protein supplements which balance home grown feeds at lowest cost per pound of protein.	3.4
e.	Determine amount and kind of grain to be fed, considering milk prices and input costs.	3.4

f.	Determine optimum feeding systems and schedule.	3.3
g.	Calculate amount of feed needed annually.	3.3
h.	Calculate cost of feeding animals and determine income/feed cost.	3.2
i.	Analyze feed tags.	3.2
j.	Prepare needed mineral mixes.	3.1
k.	Match crop system with livestock needs. #	
11.	Provide adequate amount of nutrients for animals.	3.3
a.	Feed producing cows a balanced ration based on nutritive needs.	3.6
b.	Balance and feed proper ration for dry cows.	3.5
c.	Recognize factors which affect nutritive value and palatibility of feed stuffs.	3.4
d.	Determine correct calcium-phosphorus ratio.	3.4
e.	Use crude protein and digestible protein data correctly when balancing rations.	3.4
f.	Understand causes of digestive tract disorders and how to prevent them.	3.2
g.	Use feed additives wisely when needed.	3.2
h.	Analyze the concept of "lead feeding" and challenge feeding.	3.2
i.	Collect representative samples of grain and forage for nutrient analysis.	3.1
j.	Use feed test results in balancing rations.	3.1
k.	Determine amounts of non-protein nitrogen in feedstuffs.	3.0
12.	Feed replacement animals for fast, economical growth.	3.0
a.	Recognize problems associated with over or under feeding.	3.5
b.	Select best calf feeding program (whole milk, sour colostrum, or milk replacer).	3.4
c.	Select or prepare an adequate calf starter.	3.3
d.	Feed correct kind and amount of forage.	3.3
e.	Force feed colostrum within thirty minutes of birth.	3.3
f.	Calculate adequate and economical rations for heifers of different sizes.	3.1
g.	Determine correct weaning time.	3.0
h.	Analyze milk replacers for quality.	2.7
i.	Estimate calf's weight accurately (or weigh animal).	2.4
j.	Evalute once-a-day feeding.	2.1
13.	Manage herd for most profitable reproduction.	3.2
a.	Keep breeding and reproductive records.	3.9
b.	Detect cows in heat and determine best time for breeding.	3.8

# Not included on questionnaire but recommended by some experts surveyed.

c.	Plan and follow constructive breeding programs.	3.8
d.	Inseminate cow if direct herd service is used.	3.6
e.	Know the reproductive cycle of dairy animals.	3.5
f.	Breed cows for twelve month calving intervals.	3.4
g.	Service heifers with top quality dairy bulls..	3.4
h.	Determine best time to dry up a cow.	3.4
i.	Determine causes of infertility.	3.4
j.	Plan breeding program for even milk production throughout the year or for higher market price periods.	3.3
k.	Consider the advantages and disadvantages of artificial insemination.	3.3
l.	Determine age and/or weight at which to artificially inseminate.	3.3
m.	Identify anatomy of the female reproductive tract and know the function of the tract.	3.2
n.	Determine losses caused by delay of pregnancy.	3.1
o.	Check animals for pregnancy.	3.1
p.	Decide whether to use artificial insemination technician or direct herd service.	2.7
q.	Estimate the weight of dairy heifers.	2.5
r.	Know the process of fetal development.	2.3
s.	Flush animals before breeding to improve conception rate.	1.6
14.	Select breeding and production animals.	3.2
a.	Select for production and physical traits that are highly heritable.	3.6
b.	Cull cows that do not meet herd standards.	3.6
c.	Select sires with high proofs and high repeatability.	3.5
d.	Evaluate desirable conformation in areas of general appearance, dairy character, body capacity, and mammary system.	3.5
e.	Use performance and pedigree information in selecting herd replacements.	3.4
f.	Select most desirable cows from which to raise future replacement animals.	3.2
g.	Select breeds most appropriate for the dairy farm.	3.1
h.	Identify parts of the dairy animal and understand their function.	3.1
i.	Determine how much to pay for replacement animals.	3.1
j.	Determine losses caused by dairy animals being bred to beef bulls.	2.9
k.	Determine expected production increases from selecting top quality sires.	2.9

	l.	Compare advantages and disadvantages of selecting grade versus purebred cattle.	2.9
	m.	Determine best buy per ampule of semen.#	
	n.	Determine the most effective herd replacement rate to optimize genetic improvement and understand factors influencing it.#	
	o.	Understand and utilize the principles of effective mating structures.#	
15.		Apply basic economic principles.	3.3
	a.	Budget available resources (money, land, labor, and capital) into the use of returning the highest final profit.	3.5
	b.	Understand use of capital and its relationship to other farm resources.	3.3
	c.	Fit dairy operation into the whole farm management system as affected by markets and prices.	3.2
16.		Obtain and use credit wisely.	3.3
	a.	Obtain a loan with repayment schedule that can be met.	3.7
	b.	Maintain excellent credit rating.	3.7
	c.	Understand loan requirements (repayment terms, legal terms, interest charges, security requirements, etc.).	3.5
	d.	Realize risks and uncertainties of using borrowed capital.	3.5
	e.	Locate sources of financial help in establishing and maintaining a dairy herd.	3.3
	f.	Manage family personal expenses wisely.	3.2
	g.	Figure total "least cost" credit sources for financing the farm business.	3.2
	h.	Consider credit life insurance.	2.4
	i.	Realize the importance of borrowing money and using it as a tool.#	
17.		Keep accurate and adequate farm records.	3.2
	a.	Keep dairy herd management records (DHIA, health, calving, etc.).	3.7
	b.	Keep income and expense records.	3.6
	c.	Maintain up-to-date depreciation schedule.	3.3
	d.	Determine net farm income.	3.2
	e.	Take an accurate inventory.	3.2
	f.	Prepare a personal net worth statement.	2.8
	g.	Plan for and compute income taxes.	2.8

Not included on questionnaire but recommended by some experts surveyed.

18.	Analyze farming enterprises annually.		3.1
	a.	Analyze dairy operations annually.	3.3
	b.	Compare dairy farm performance with individual goals and similar farming operations.	3.2
	c.	Prepare income statement (profit and loss from current year's operation).	3.0
	d.	Calculate rate of return/$ invested, management return, ratio of assets to liabilities, ratio of gross farm income to liabilities.	2.9
19.	Project or plan for the future.		2.9
	a.	Determine family goals for the future.	3.1
	b.	Plan credit needs for one year with adequate operating resources.	3.0
	c.	Plan for use of intermediate and long term credit.	2.9
	d.	Calculate total amount of credit required.	2.9
	e.	Prepare a budget for the dairy operation (one year).	2.8
	f.	Develop a cash flow projection on the dairy operation (3 - 5 years).	2.5
20.	Provide adequate and economical milk handling system.		3.3
	a.	Operate milking and economical milk handling system.	3.3
	b.	Maintain milking equipment properly.	3.7
	c.	Supply adequate and stable vacuum for milking.	3.7
	d.	Maintain proper sanitation program.	3.6
	e.	Produce milk that meets or surpasses quality standards.	3.6
	f.	Operate equipment to properly cool milk.	3.6
	g.	Determine best system for their situation.	3.1
	h.	Select milking equipment.	3.1
	i.	Compare pipeline systems.	3.1
	j.	Design milkhouse arrangement for efficient work routine.	2.9
	k.	Compare and select milk cooling system.	2.8
	l.	Determine if a pipeline or transfer system is needed.	2.6
21.	Provide adequate and economical housing for dairy animals.		3.1
	a.	Provide adequate ventilation through fans, intakes, etc.	3.5
	b.	Maintain adequate maternity and hospital area.	3.4
	c.	Maintain good environment for dairy animals.	3.4

	d.	Group calves according to size after weaning.	3.2
	e.	Determine ventilation needs of dairy building.	3.2
	f.	Keep housing in good repair.	3.2
	g.	Use individual calf pens for baby calves.	3.1
	h.	Determine housing requirements for animals of different ages.	3.1
	i.	Provide sufficient and low cost housing for dairy replacements.	3.1
	j.	Develop plans for new dairy facilities.	2.9
	k.	Lay out plans for improving existing facility.	2.9
	l.	Analyze different systems of dairy housing.	2.8
22.		Provide adequate and economical materials handling equipment.	3.0
	a.	Make necessary improvements in manure handling system.	3.4
	b.	Plan labor saving chore routine.	3.3
	c.	Provide manure handling system.	3.0
	d.	Evaluate present manure handling system.	3.0
	e.	Calculate amount of storage needed annually.	2.9
	f.	Operate and maintain materials handling equipment.	2.9
	g.	Provide additional storage as needed.	2.9
	h.	Compare methods of manure disposal.	2.8
	i.	Determine best feed handling system.	2.8
	j.	Compare feed handling systems.	2.6
23.		Determine if and when additional labor should be hired.	3.1
	a.	Evaluate own ability to manage labor.	3.3
	b.	Recognize when time should be spent on labor management rather than actual labor.	3.2
	c.	Figure costs and returns of additional labor in dairy herd expansion.	3.0
	d.	Compute changes in labor requirements as size of enterprises change.	2.9
24.		Plan for labor needs.	3.1
	a.	Anticipate and prepare for peak work loads in the farm work schedule.	3.4
	b.	Assign appropriate priorities to the farm work to be done.	3.4
	c.	Plan the daily and weekly work schedule in advance.	3.1
	d.	Calculate relative amounts and seasonal distribution of the labor requirements for the entire farm operation by enterprise.	3.0
	e.	Plan for the cropping and livestock program to distribute the labor load.	3.0
	f.	Know the availability and cost of hired labor during different times of the year.	2.8

	g.	Determine size of operation needed to employ full time help.	2.8
25.		Recruit and hire additional labor.	3.0
	a.	Comply with employers legal responsibilities (Social Security withholding taxes, OSHA., insurance, etc.).	3.4
	b.	Train employees to perform their job adequately.	3.3
	c.	Lead but do not needlessly dominate employees.	3.3
	d.	Compensate employees for work done.	3.3
	e.	Give instructions to employees quickly and clearly.	3.2
	f.	Make definite agreements with hired workers about working conditions.	3.1
	g.	Assign jobs to employees according to their ability and interest.	3.1
	h.	Encourage employees to develop greater abilities.	3.0
	i.	Evalute prospective employees.	3.0
	j.	Meet personal needs of hired workers (housing, recreation, personal goals, etc.).	3.0
26.		Know the dairy industry.	2.6
	a.	Develop production goals for dairy herd.	3.7
	b.	Interpret dairy product standards set by local milk market.	2.9
	c.	Determine how dairy product prices are affected by Federal price supports and marketing orders.	2.7
	d.	Analyze trends in dairy product demand as they affect local markets for producer's milk.	2.4
	e.	Recognize trends in livestock production for local area, state, and nation.	2.4
	f.	Determine how the dairy market is influenced by the export-import system.	2.4
	g.	Identify the importance of the livestock industry and particularly the dairy industry in the local community, state, and nation.	2.4
	h.	Determine factors affecting the location of major livestock enterprises in the state and nation.	2.1
	i.	Determine how the future of dairy prices will be affected by dairy substitutes.	2.0

CATFISH FARMER

Other Titles: Fish Farmer, Fingerling Farmer, Fee Lake Operator, Live Hauler, Fish Farm Worker.

Job Description:

The occupation of Catfish Farmer involves a wide range of activities in the management and operation of farms producing catfish. The size of the farms varies considerably. Responsibilities may depend on the extent of diversification on the farm in producing other crops. Most catfish farmers are self-employed. Examples of the kind of work done may include designing, laying out, and constructing water facilities; securing necessary financial support and budgeting expenditures; managing water; feeding fish; controlling parasites and diseases; selecting and managing breeding stock; spawning and rearing fingerlings; and harvesting, grading, and marketing fish.

Competencies Identified and Validated

N = 32*

Competencies			Weighted Mean**
1.	Establish water facilities.		2.6
	a.	Select site for ponds, raceways, etc.	3.4
	b.	Plan layout of water facilities.	3.0
	c.	Construct ponds.	3.0
	d.	Repair damaged water facilities.	3.0
	e.	Establish vegetative cover to maintain water facilities.	2.4
	f.	Install culture tanks and troughs.	2.4
	g.	Construct vats.	2.3
	h.	Construct pens and cages.	2.1
	i.	Construct troughs.	2.1
2.	Secure water.		3.1
	a.	Compute volume of water needed.	3.7
	b.	Determine sources of water.	3.3
	c.	Conduct water chemistry tests.	3.1
	d.	Maintain water pumps.	3.0
	e.	Install water pumps.	2.6
3.	Manage water.		3.4
	a.	Detect oxygen depletion.	3.9
	b.	Correct oxygen depletion problems.	3.8

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* Responses from 32 Catfish Farmers in 14 states. Survey conducted by Department of Agricultural and Extension Education, Mississippi State University, Mississippi State, Mississippi 39762.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Control water contamination.	3.5
d.	Prevent off-flavor in fish.	3.3
e.	Control aquatic weed growth.	3.1
f.	Control muddy water.	2.8
4.	Establish farm.	3.4
a.	Obtain necessary equipment and facilities.	3.7
b.	Secure needed finances.	3.6
c.	Budget financial resources.	3.5
d.	Employ needed labor.	3.4
e.	Submit required government reports.	2.6
5.	Understand catfish biology.	2.9
a.	Identify different species of catfish.	2.9
b.	Identify external parts of catfish.	2.8
6.	Feed catfish.	3.2
a.	Determine amount to feed.	3.7
b.	Select form of feed to use.	3.4
c.	Select methods of feeding.	3.1
d.	Balance rations.	2.8
7.	Operate equipment.	2.9
a.	Operate water pumps.	3.3
b.	Operate aerators.	3.2
c.	Operate water regulation devices.	3.2
d.	Operate truck.	3.2
e.	Operate powered booms for lifting fish.	2.8
f.	Operate feeding equipment.	2.7
g.	Operate outboard motorboat.	2.6
h.	Operate seine haulers.	2.6
i.	Operate farm tractor.	2.4
8.	Control diseases and parasites.	3.7
a.	Determine symptoms.	3.8
b.	Treat fish.	3.8
c.	Select treatment.	3.7
d.	Calculate chemical treatments.	3.7
e.	Diagnose problems.	3.5
9.	Control pests.	3.0
a.	Control trash fish.	3.3
b.	Control fish predators (snakes, birds, etc.).	2.9
c.	Identify trash fish.	2.9
10.	Manage broodfish.	3.3
a.	Determine sex of catfish.	3.6
b.	Select broodfish.	3.3
c.	Calculate number of broodfish needed.	3.3
d.	Locate sources of broodfish.	3.2
e.	Improve broodfish stock.	3.1

11.	Spawn fish.	2.9
a.	Establish nests.	3.3
b.	Select fish to spawn.	3.3
c.	Collect egg masses.	3.0
d.	Transport egg masses.	3.0
e.	Observe spawning.	2.5
f.	Control spawning time of fish.	2.2
12.	Hatch eggs.	3.4
a.	Check water temperature.	3.5
b.	Manage artificial hatching facilities.	3.4
c.	Handle egg masses.	3.3
13.	Rear fry.	3.1
a.	Feed fry.	3.5
b.	Handle fry.	3.2
c.	Determine number of fry.	3.0
d.	Determine size of fry.	2.8
14.	Rear fingerlings.	3.1
a.	Feed fingerlings.	3.7
b.	Determine number of fingerlings.	3.1
c.	Determine size of fingerlings.	2.9
d.	Classify fingerlings by length.	2.8
15.	Grow food fish.	3.1
a.	Determine stocking rate.	3.6
b.	Manage open ponds.	3.5
c.	Select fingerlings.	3.4
d.	Manage raceways.	2.7
e.	Manage tanks.	2.5
f.	Manage cages.	2.4
16.	Harvest fish.	3.2
a.	Select method of harvesting.	3.5
b.	Select type of harvest to use (partial or complete).	3.4
c.	Set seine.	3.2
d.	Haul seine.	3.2
e.	Lift fish.	3.1
f.	Use live car.	2.9
17.	Market fish.	3.4
a.	Locate market outlets.	3.5
b.	Select method of marketing.	3.4
c.	Haul fish.	3.3
d.	Grade fish.	3.2
18.	Process fish.	3.4
a.	Establish selling price.	3.9
b.	Check fish for off-flavor.	3.7
c.	Dress fish.	2.6

HORSE PRODUCTION EMPLOYEE

Other Titles: Horse Farm Employee, Horse Rancher, Horse Producer, Livestock Farm Employee, Rancher.

Job Description:

Ground trains the horse and trains the horse to drive and/or ride applying handling techniques to handle the horse safely and cares for the horse after work. Compares methods of breeding, plans and applies a breeding program. Applies sanitation and health practices, recognizes symptoms of common equine diseases and applies a parasite and disease control program by developing a veterinary client relationship. Prepares and exhibits the horse in competition. Grooms the horse caring for the horse's limbs and hooves. Calculates nutritive requirements, evaluates sources of nutrients, prepares feed rations, and feeds horses. Improves and uses pastures. Develops a horse farm record system with budgets and insurance plan to compute taxes and marks the horse for identification. Buys and sells horses comparing and contrasting marketing methods, selects market, and determines market value and financing method. Identifies major breeds and types of horses, and determines age, weight and height to select and judge horses. Installs, maintains, and repairs horse farm buildings, water systems, electrical systems, and training facilities. Evaluates and constructs horse farm buildings and applies environmental control practices. Builds fences and recommends requirements for stalls, hallway or alleyway and tackroom. Practices fire prevention methods and follows proper procedures during fire.

Competencies Identified and Validated

N = 46*

Competencies		Weighted Mean**
1.	Classify and select horses.	2.6
	a. Select horses.	2.9
	b. Judge horses.	2.7
	c. Determine age, weight, and height.	2.0
	d. Identify the major breeds of horses by classes and types.	2.0
2.	Feed horses.	3.1
	a. Feed horses.	3.3

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* Responses from 46 Horse Producers in 9 states. Survey conducted by the Department of Agricultural Education, Texas A & M University, College Station, Texas 77843.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Calculate nutritive requirements of horses.	3.0
	c.	Evaluate sources of feed nutrients.	3.0
	d.	Prepare feed rations.	2.9
3.		Manage pastures.	2.7
	a.	Use pasture.	2.7
	b.	Improve pastures.	2.6
4.		Control parasites, diseases, and injuries.	3.4
	a.	Recognize symptoms of common equine diseases.	3.6
	b.	Apply sanitation and health practices.	3.4
	c.	Apply parasite and disease control program.	3.3
	d.	Develop veterinary-client relationship.	3.1
5.		Install, maintain, and repair horse farm buildings, equipment, and training facilities.	2.7
	a.	Practice fire prevention methods.	3.6
	b.	Discuss procedures to follow during fire.	3.4
	c.	Build fences.	3.1
	d.	Select, maintain, and repair horse equipment.	2.8
	e.	Evaluate horse farm buildings.	2.6
	f.	Recommend requirements for a stall, hallway or alleyway, and tack room.	2.5
	g.	Construct farm buildings.	2.4
	h.	Apply environmental control practices.	2.3
	i.	Plan, install, maintain, and repair a water system for horse farm buildings.	2.3
	j.	Install, maintain, and repair electrical wiring and demonstrate electrical safety.	1.7
6.		Groom and leg and hoof care for the horse.	3.1
	a.	Groom the horse.	3.1
	b.	Care for the horse's limbs and hooves.	3.1
7.		Train and handle horses.	3.4
	a.	Handle horses safely.	3.9
	b.	Care for horse after work.	3.6
	c.	Ground trains the horse.	3.3
	d.	Apply handling techniques according to age, size, sex, and temperament.	3.3
	e.	Train the horses to drive and/or ride.	2.8
8.		Exhibit the horse.	3.2
	a.	Prepare for competition.	3.2
9.		Breed horses.	3.3
	a.	Apply a breeding program.	3.6
	b.	Plan a breeding program.	3.4
	c.	Compare methods of breeding horses.	2.9

10.	Buy and sell horses.	2.5
	a. Determine market value.	2.8
	b. Compare and contrast methods of marketing horses.	2.5
	c. Select markets.	2.4
	d. Determine financing methods.	2.4
11.	Maintain records required for horse production.	2.6
	a. Develop a record keeping system peculiar to the horse farm.	2.8
	b. Mark the horse for identification.	2.7
	c. Compute taxes peculiar to the horse farm.	2.6
	d. Develop an insurance plan for horse farm.	2.5
	e. Develop a budget for the horse farm.	2.4

BROILER GROWER

Other Titles: Chicken Farmer, Broiler Producer, Chicken Rancher.

Job Description:

Broiler Growers provide daily care for flocks of young chickens, from hatching until about eight weeks of age. They must maintain the proper environment for the birds and see that they have plenty of feed and water. Broiler Growers usually live near their work and set their own work schedule. The chicks, however, must be looked after seven days a week. Broiler Growers are usually self-employed and grow broilers under contract with a broiler contractor which provide them with baby chicks, feed, medication, supervision, and labor and equipment for catching and hauling the broilers to market.

Competencies Identified and Validated

N = 32*

Competencies	Weighted Mean**
1. Provide housing, equipment, and supplies.	4.0
a. Provide housing.	4.0
b. Provide feeding equipment.	4.0
c, Provide watering equipment.	4.0
d. Provide brooding equipment.	3.9
e. Provide adequate water supply.	3.7
f. Purchase needed supplies.	3.4
g. Supply litter.	3.3
2. Secure contract to grow broilers.	3.8
3. Prepare house for baby chicks.	3.9
a. Put out feed and water.	3.9
b. Light and adjust brooders.	3.9
c. Spread litter.	3.7
d. Install brooder guard.	2.9
4. Maintain correct environment.	3.7
a. Maintain correct brooder temperature.	3.7
b. Provide proper ventilation.	3.7
c. Maintain correct house temperature.	3.5
d. Provide proper lighting.	3.3
e. Prevent excessive humidity.	3.0

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* Responses from 32 Broiler Growers in 9 states. Survey conducted by Department of Agricultural Education, University of Georgia, Athens, Georgia 30602.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

5.	Maintain sanitation.		3.8
	a.	Dispose of dead birds.	3.8
	b.	Clean drinkers.	3.4
	c.	Remove all litter when needed.	3.3
	d.	Remove wet litter from house.	3.2
6.	Maintain grounds around buildings.		3.2
	a.	Maintain driveways.	3.6
	b.	Maintain drainage ditches.	3.3
	c.	Mow grass and weeds.	3.0
7.	Control pests of broilers.		3.5
	a.	Administer vaccines and other medication.	3.8
	b.	Consider human safety in administering drugs.	3.4
	c.	Control insect pests of broilers.	3.3
	d.	Recognize signs of rodents.	3.3
	e.	Adminster rodent control measures.	3.3
	f.	Recognize disease symptoms.	3.2
	g.	Prevent wild birds from entering house.	3.2
	h.	Recognize insect pests of broilers.	3.1
8.	Operate equipment and machinery.		3.7
	a.	Adjust equipment for maximum efficiency.	3.5
	b.	Recognize malfunction in equipment.	3.4
	c.	Service machinery and equipment according to operator's manual.	3.2
	d.	Use safety standards relating to the operation of a particular piece of equipment.	3.2
	e.	Prepare machinery and equipment for storage.	2.9
9.	Maintain buildings and equipment.		3.6
	a.	Maintain watering equipment.	3.8
	b.	Maintain brooding equipment.	3.8
	c.	Maintain electrical system.	3.7
	d.	Maintain plumbing.	3.7
	e.	Maintain feeding equipment.	3.7
	f.	Maintain curtains and curtain controls.	3.5
	g.	Repair buildings.	3.3
	h.	Maintain tractor and tractor equipment.	2.9
	i.	Paint buildings.	2.3
10.	Prepare for removal of broilers.		3.7
	a.	Dismantle and move equipment out of way of catching crew.	3.6
	b.	Prevent chickens from piling up and smothering while catching crew is working.	2.7
11.	Keep records.		3.3
	a.	Record chick mortality daily.	3.3
	b.	Keep management records.	3.0
	c.	Keep records on equipment servicing and maintenance.	2.5

EGG PRODUCER

Other Titles: Flock Manager, Chicken Farmer.

Job Description:

Egg Producers are persons who provide daily care for a flock of laying hens. They must maintain the proper environment for the hens and see that they have plenty of feed and water. They are responsible for gathering and properly caring for the eggs. Egg Producers usually live near their work and set their own work schedule. The hens and eggs, however, must be looked after seven days a week. The Egg Producer is usually self-employed, however, they may provide their own financing and management; or they may produce the eggs under a contract. If they have a contract, the contractor usually provides the starting pullets, the feed, medication, and supervision. The Egg Producer must furnish the needed labor, equipment, and daily management.

Competencies Identified and Validated

N = 30*

Competencies			Weighted Mean**
1.	Provide financing.		3.5
2.	Provide housing, equipment, and supplies.		3.7
	a.	Provide watering equipment.	3.9
	b.	Provide adequate water supply.	3.9
	c.	Provide housing.	3.7
	d.	Provide feeding equipment.	3.6
	e.	Purchase needed supplies.	3.2
	f.	Supply litter.	3.0
3.	Secure contract to produce eggs.		3.1
4.	Prepare house for started pullets.		3.4
	a.	Provide feed and water.	3.5
	b.	Spread litter, if floor house.	3.3
5.	Maintain correct environment.		3.4
	a.	Provide proper lighting.	3.7
	b.	Provide proper ventilation.	3.5
	c.	Maintain correct house temperature.	3.4
	d.	Control odors.	3.3
	e.	Control flies.	3.3

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* Responses from 30 Egg Producers in 10 states. Survey conducted by Department of Agricultural Education, University of Georgia, Athens, Georgia 30602.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

6.	Maintain sanitation.		3.7
	a.	Dispose of dead birds.	3.6
	b.	Clean drinkers.	3.5
	c.	Dispose of manure.	3.5
	d.	Remove all litter when needed.	3.4
	e.	Remove wet litter from house.	3.3
7.	Care for eggs.		3.4
	a.	Gather eggs.	3.8
	b.	Refrigerate eggs.	3.8
	c.	Case or rack eggs.	3.5
	d.	Remove cracked eggs and leakers.	3.0
	e.	Wash soiled eggs.	2.9
8.	Maintain grounds around buildings.		3.1
	a.	Mow grass and weeds.	3.0
	b.	Maintain driveways.	3.0
	c.	Maintain drainage ditches.	2.9
9.	Control pests of hens.		3.7
	a.	Recognize disease symptoms.	3.5
	b.	Control insect pests of hens.	3.5
	c.	Administer vaccines and other medicines.	3.4
	d.	Recognize insect pests of hens.	3.3
	e.	Recognize signs of rodents.	3.2
	f.	Administer rodent control measures.	3.2
	g.	Prevent wild birds from entering house.	3.2
	h.	Consider human safety in administering drugs.	3.3
10.	Operate equipment and machinery.		3.3
	a.	Service machinery and equipment according to operator's manual.	3.2
	b.	Use safety standards relating to the operation of a particular piece of equipment.	3.2
	c.	Adjust equipment for maximum efficiency.	3.3
	d.	Recognize malfunction in equipment.	3.3
	e.	Prepare machinery and equipment for storage.	3.0
11.	Maintain buildings and equipment.		3.2
	a.	Maintain watering equipment.	3.5
	b.	Maintain feeding equipment.	3.5
	c.	Maintain plumbing.	3.4
	d.	Maintain electrical system.	3.4
	e.	Maintain egg gathering equipment.	3.4
	f.	Maintain curtains and curtain controls.	3.3
	g.	Maintain tractor and tractor equipment.	2.9
	h.	Repair buildings.	2.9
	i.	Paint buildings.	2.6

12.	Prepare for removal of hens.		3.1
	a.	Prevent hens from piling up and smothering while catching crew is working.	3.2
	b.	Dismantle and move equipment out of way of catching crew.	3.0
13.	Keep records.		3.7
	a.	Keep production records.	3.8
	b.	Record hen mortality daily.	3.6
	c.	Keep management records.	3.5
	d.	Keep records on equipment servicing and maintenance.	3.2

TURKEY GROWER

Other Titles: Turkey Farmer, Turkey Producer.

Job Description:

Turkey Growers are persons who provide daily care for a flock of young turkeys from hatching to market. They must maintain the proper environment for the birds and see that they have plenty of feed and water. Turkey Growers usually live near their work and set their own work schedules. The birds, however, must be looked after seven days a week. Turkey Growers usually are self-employed and either procure the poults and grow the birds to market age providing their own financing, or they secure a contract to grow the birds out to market age. With a contract the contractor usually furnishes the poults, feed, medication, supervision, and labor and equipment to haul the birds to market. Growers usually furnish housing, equipment, labor, and daily management.

Competencies Identified and Validated

N = 33*

Competencies		Weighted Mean**
1.	Provide financing.	3.5
2.	Provide housing, equipment, and supplies.	3.7
	a. Provide housing.	3.8
	b. Provide feeding equipment.	3.8
	c. Provide watering equipment.	3.8
	d. Provide brooding equipment.	3.8
	e. Provide adequate water supply.	3.8
	f. Purchase needed supplies.	3.3
	g. Supply litter.	3.2
	h. Provide feed.	3.1
3.	Secure contract to grow turkeys or procure poults.	3.5
4.	Prepare house for poults.	3.9
	a. Light and adjust brooders.	3.9
	b. Spread litter.	3.8
	c. Install brooder guard.	3.8
	d. Put out feed and water.	3.8
5.	Maintain correct environment.	4.0

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* Responses from 33 Turkey Growers in 10 states. Survey conducted by Department of Agricultural Education, University of Georgia, Athens, Georgia 30602.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a.	Maintain correct house temperature.	3.8
	b.	Maintain correct brooder temperature.	3.8
	c.	Provide proper ventilation.	3.8
	d.	Prevent excessive humidity.	3.6
	e.	Provide proper lighting.	3.4
6.	Maintain sanitation.		3.9
	a.	Dispose of dead birds.	3.9
	b.	Clean drinkers.	3.8
	c.	Remove all litter when needed.	3.5
	d.	Remove wet litter from house.	3.4
7.	Maintain grounds around buildings.		3.1
	a.	Mow grass and weeds.	3.1
	b.	Maintain driveways.	3.1
	c.	Maintain drainage ditches.	3.1
8.	Control pests of turkeys.		3.6
	a.	Consider human safety in administering drugs.	3.6
	b.	Recognize disease symptoms.	3.4
	c.	Administer rodent control measures.	3.4
	d.	Prevent wild birds from entering house.	3.4
	e.	Control insect pests of turkeys.	3.3
	f.	Administer vaccines and other medicines.	3.2
	g.	Recognize signs of rodents.	3.2
	h.	Recognize insect pests of turkeys.	3.1
9.	Operate equipment and machinery.		3.6
	a.	Adjust equipment for maximum efficiency.	3.6
	b.	Use safety standards relating to the operation of a particular piece of equipment.	3.4
	c.	Recognize malfunction in equipment.	3.4
	d.	Service machinery and equipment according to operator's manual.	3.2
	e.	Prepare machinery and equipment for storage.	3.1
10.	Maintain buildings and equipment.		3.8
	a.	Maintain feeding equipment.	3.6
	b.	Maintain watering equipment.	3.6
	c.	Maintain brooding equipment.	3.6
	d.	Maintain curtains and curtain controls.	3.5
	e.	Maintain plumbing.	3.4
	f.	Maintain electrical system.	3.4
	g.	Maintain tractor and tractor equipment.	3.0
	h.	Repair buildings.	2.9
	i.	Paint buildings.	2.3
11.	Provide range for turkeys.		3.6
	a.	Control varmints.	3.4
	b.	Move turkeys to range.	3.3
	c.	Construct and maintain fence.	3.3

12.	Market turkeys.	2.6
	a. Locate market for birds.	2.8
	b. Load birds for hauling.	2.7
	c. Transport birds to market.	1.9
13.	Keep records.	3.7
	a. Record poult mortality daily.	3.7
	b. Keep management records.	3.3
	c. Keep records on equipment servicing and maintenance.	2.7

SHEEP RANCHER

Other Titles: Sheep Farmer, Sheep Breeder, Sheep Producer, Wool Grower.

Job Description:

Sheep Ranchers are responsible for the success or failure of the sheep production enterprise as they make all the critical management decisions. These decisions include those in marketing, breeding, shearing, feed production and feeding. They supervise all labor and operations of the sheep ranch. They keep records and develop health and predator control programs. They construct facilities and equipment using hand and power tools. They operate and maintain power machinery and equipment. They perform legislative and service activities.

Competencies Identified and Validated

N = 41*

	Competencies	Weighted Mean**
1.	Management decisions.	3.3
a.	Determine the best type of feeding program.	3.7
b.	Plan efficient utilization of feed, water, and storage facilities.	3.6
c.	Determine long and short term goals of the operation.	3.6
d.	Plan the efficient utilization of all available resources, such as water, timber, and range land.	3.5
e.	Plan the efficient utilization and layout of pens and shelter.	3.4
f.	Balance rations for lambs on feed.	3.4
g.	Determine the value of land to rent or buy.	3.3
h.	Insure timeliness of all operations.	3.3
i.	Determine cleaning and sanitation requirements for the operation.	3.3
j.	Arrange for transportation of sheep.	3.2
k.	Determine when to use professional services.	3.2
l.	Plan effective use of equipment.	3.2
m.	Determine transportation needs.	3.1
n.	Read and interpret various lease and grazing requirements.	3.1
o.	Determine safety precautions to be observed.	3.0
p.	Plan the insurance program for the operation.	3.0
q.	Determine when to move camp.	2.6
2.	Maintain and use hand and power tools.	3.2
a.	Use power tools safely.	3.6

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* Responses from 41 National Wool Growers and Sheep Producers in 27 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Use hand tools safely.	3.5
	c.	Instruct employees on safe use of hand and power tools.	3.5
	d.	Read and interpret instructions on power tool operation.	3.4
	e.	Identify tools.	3.3
	f.	Clean tools.	3.1
	g.	Adjust power tools.	3.1
	h.	Sharpen tools.	3.0
	i.	Recondition tools.	2.6
3.	Feed and feeding.		3.2
	a.	Calculate cost of rations.	3.6
	b.	Develop and balance rations.	3.6
	c.	Identify spoiled feed.	3.6
	d.	Determine when and what supplemental feed must be fed.	3.6
	e.	Determine proper amounts to feed various sheep.	3.6
	f.	Feed sheep.	3.5
	g.	Determine water requirements for flock.	3.5
	h.	Determine nutrient requirements.	3.5
	i.	Distribute salt and mineral blocks.	3.4
	j.	Calculate feed efficiency.	3.4
	k.	Identify feeds.	3.4
	l.	Clean and fill waterers.	3.4
	m.	Determine equipment needed to feed sheep.	3.4
	n.	Identify nutrient deficiencies in sheep.	3.4
	o.	Feed lambs.	3.4
	p.	Flush ewes and rams.	3.4
	q.	Wean lambs.	3.4
	r.	Determine relative nutrient value of feedstuffs.	3.3
	s.	Interpret feed analysis reports.	3.3
	t.	Interpret feed tags and labels.	3.3
	u.	Check ewes' milk supply.	3.3
	v.	Determine when lambs may be started on roughages and grain.	3.3
	w.	Feed grazing sheep supplemental rations.	3.0
	x.	Mix feed.	2.7
	y.	Break up mineral salt in troughs or boxes.	2.4
4.	Marketing (buying).		3.2
	a.	Select and purchase desirable breeding stock.	3.8
	b.	Buy feed at the best price.	3.7
	c.	Select and purchase drugs and veterinary supplies.	3.4
	d.	Buy farm equipment and machinery.	3.3
	e.	Buy supplies and materials.	3.2
	f.	Buy parts and supplies for machinery.	3.1
	g.	Select and purchase desirable lambs.	3.0
	h.	Develop bill of materials.	3.0
	i.	Buy groceries for herders and lambing camp help.	2.1

5.	Machinery and equipment operation, maintenance, and repair.	3.2
a.	Grease and oil equipment.	3.4
b.	Develop a maintenance schedule for vehicles and equipment.	3.4
c.	Read and interpret operator's manual or assembly diagrams.	3.3
d.	Add coolant to cooling systems.	3.3
e.	Inspect equipment for operating defects.	3.3
f.	Operate a tractor.	3.3
g.	Change oil and oil filters.	3.3
h.	Inflate tires.	3.3
i.	Install and adjust belts or chains.	3.2
j.	Install and service battery.	3.2
k.	Operate a truck loaded with sheep.	3.2
l.	Clean debris and dirt from vehicles.	3.1
m.	Identify hardware.	3.1
n.	Repack bearings.	2.9
o.	Replace and adjust spark plugs.	2.9
p.	Adjust carburetors.	2.5
6.	Health program development.	3.2
a.	Identify symptoms of common diseases.	3.8
b.	Prevent common diseases and parasites.	3.7
c.	Identify symptoms of common parasites.	3.7
d.	Interpret labels on medicines, drugs, and pesticide containers.	3.7
e.	Isolate sheep with transmissible diseases.	3.6
f.	Determine when to rotate pastures to control parasites.	3.6
g.	Identify injuries on sheep.	3.5
h.	Develop a vaccination program.	3.5
i.	Determine amounts of medicines or materials needed for specific situations.	3.5
j.	Identify and correct sanitation problems.	3.5
k.	Inspect sheep for defects.	3.4
l.	Calculate the cost of various health programs.	3.4
m.	Remove manure from quarters or pens.	3.3
n.	Vaccinate sheep.	3.3
o.	Identify poisonous plants.	3.3
p.	Worm sheep.	3.3
q.	Drench sheep.	3.3
r.	Isolate newly purchased animals.	3.2
s.	Store pesticides, vaccines and medicines.	3.2
t.	Remove or bury dead animals.	3.2
u.	Check rams for epididymitis.	3.2
v.	Disinfect buildings and equipment.	3.1
w.	Supply medication through feed and water.	3.0
x.	Precondition animals prior to shipment.	3.0
y.	Pill sheep.	3.0
z.	Treat nicked or cut sheep.	3.0
aa.	Spread manure.	2.9
bb.	Spray sheep.	2.8

cc.	Grub out or otherwise remove poisonous plants.	2.7
dd.	Bathe sheep in foot bath.	2.6
ee.	Take temperature.	2.5
ff.	Dip sheep.	2.4
gg.	Make worm egg counts.	2.2
hh.	Take a blood sample.	1.7
7.	Record keeping.	3.1
a.	Keep purchases and sales records.	3.7
b.	Keep financial records.	3.6
c.	Count sheep.	3.6
d.	Keep livestock and equipment inventories.	3.5
e.	Keep personal records.	3.5
f.	Determine efficiency of production.	3.4
g.	Determine market costs.	3.4
h.	Keep records of vaccinations, disease treatment, and death losses.	3.4
i.	Maintain production records.	3.4
j.	Determine net worth of the operation.	3.3
k.	Maintain records of predator and other death losses.	3.3
l.	Assist accountant in preparing tax return.	3.3
m.	Set up and maintain record keeping systems.	3.3
n.	Keep record of cost involved in disease and injury prevention and treatment.	3.3
o.	Maintain records of private and government leases and permits.	3.3
p.	Prepare a budget.	3.2
q.	Execute responsibility for payroll and withholding.	3.2
r.	Keep personnel records.	3.2
s.	Use scales and record weights of crops, feed, or sheep.	3.2
t.	Figure depreciation.	3.1
u.	Maintain equipment maintenance records.	3.0
v.	Determine rate of gain.	3.0
w.	Maintain vehicle records.	3.0
x.	Maintain breeding records.	3.0
y.	Interpret sire summaries and production records.	2.9
z.	Interpret progeny testing records.	2.7
aa.	Record information of individual ewe performance.	2.7
bb.	Maintain official production records.	2.6
cc.	Register breeding stock.	2.6
dd.	Interpret pedigrees.	2.5
8.	Judging and selection.	3.1
a.	Cull breeding stock.	3.7
b.	Determine which breed(s) or type of sheep is best suited to the local situation.	3.6
c.	Identify defects in sheep.	3.5
d.	Determine condition of a flock or pen of sheep.	3.5
e.	Determine age.	3.5
f.	Determine condition of teeth.	3.4

	g.	Remove incompatible sheep from flock.	3.3
	h.	Attend breeding stock sales and purchase stock.	3.2
	i.	Use production records as a selection tool.	3.2
	j.	Sort sheep according to size, weight, sex and condition.	3.0
	k.	Identify various breeds.	3.0
	l.	Identify points or traits which breed associations discriminate against.	2.9
	m.	Identify body parts.	2.9
	n.	Assist youth in selecting project animals or foundation stock.	2.5
	o.	Judge local fairs or shows.	1.7
9.	Breeding tasks.		3.1
	a.	Determine when to start and stop breeding season.	3.7
	b.	Determine ratio of rams per 100 ewes.	3.5
	c.	Turn rams in with ewes.	3.5
	d.	Detect ewes in heat.	1.9
10.	Feed production.		3.1
	a.	Determine range or pasture quality and quantity.	3.7
	b.	Determine the capacity of a given amount of pasture or rangeland.	3.6
	c.	Control weeds or non-forage plants in pasture or rangeland.	3.2
	d.	Store feed crops.	3.2
	e.	Plant feed crops.	3.0
	f.	Fertilize feed crops.	3.0
	g.	Harvest feed crops.	3.0
	h.	Cultivate feed crops.	2.9
	i.	Irrigate feed crops.	2.3
11.	Supervision of workers and labor management.		3.0
	a.	Plan work schedules.	3.4
	b.	Determine labor needed and prepare for peak work loads.	3.4
	c.	Train employees.	3.3
	d.	Hire and fire employees.	3.3
	e.	Suggest to workers improvements in methods of accomplishing work.	3.2
	f.	Assign workers according to skills and interests.	3.1
	g.	Judge prospective employee qualifications.	3.1
	h.	Develop harmonious relationships with workers.	3.0
	i.	Negotiate specific arrangements with employees as to wages, hours, fringe benefits, etc.	3.0
	j.	Observe employee compliance to safety precautions.	3.0
	k.	Determine which regulatory laws concerning employees, apply to the operation.	2.7
	l.	Inform employees of benefits and responsibilities under regulatory laws.	2.6

	m.	Develop workers' training programs.	2.2
	n.	Maintain liason with labor organizations or agencies.	2.0
12.	Marketing (selling).		2.8
	a.	Determine when to market sheep.	3.7
	b.	Determine where to market sheep.	3.5
	c.	Properly load sheep.	3.4
	d.	Interpret market reports.	3.3
	e.	Classify or grade sheep for marketing.	3.2
	f.	Compare costs of various marketing alternatives.	3.2
	g.	Select a wool market.	3.2
	h.	Weigh sheep.	3.1
	i.	Evaluate influence of market grade on net return.	3.1
	j.	Estimate weight of lambs.	3.1
	k.	Sort lambs by weight and grade.	2.9
	l.	Calculate shrinkage of sheep.	2.9
	m.	Prepare carriers for hauling.	2.8
	n.	Consign breeding stock to sales.	2.6
	o.	Calculate yield of wool.	2.6
	p.	Prepare advertisement for sale of animals.	2.4
	q.	Calculate dressing percent.	2.3
	r.	Conduct a sale.	2.2
	s.	Grade wool.	2.1
	t.	Take pictures of stock for advertising purposes.	1.8
	u.	Identify wholesale and retail cuts.	1.7
13.	Construction and repair.		2.8
	a.	Construct or repair permanent fences.	3.3
	b.	Construct or repair temporary fences.	3.3
	c.	Construct or repair feed racks, bunks, troughs, etc.	3.3
	d.	Determine the costs of construction and repairs.	3.3
	e.	Construct or repair and hang gates and doors.	3.1
	f.	Construct lambing pens (jugs).	3.1
	g.	Replace valves in water system.	3.0
	h.	Replace fuses.	3.0
	i.	Repair leaks in roof of buildings.	3.0
	j.	Replace belts and pulleys.	3.0
	k.	Repair faucets.	2.9
	l.	Develop a working drawing of a structure to be built.	2.8
	m.	Replace water pipe.	2.8
	n.	Repair electrical cords and broken wires.	2.8
	o.	Replace electrical switches.	2.7
	p.	Replace window pane.	2.6
	q.	Build and remove concrete forms.	2.5
	r.	Wire simple electrical circuits.	2.4
	s.	Construct a windbreak.	2.4
	t.	Construct a foot bath.	2.4
	u.	Repair metal structures with arc welder.	2.4
	v.	Read and interpret blueprints.	2.4
	w.	Repair metal structures with oxyacetylene welder.	2.3

x.	Mix, pour, finish and cure concrete.	2.1
y.	Construct a major structure (barn, building or shelter).	2.1
z.	Repair sprinklers.	2.0
aa.	Lay concrete blocks.	1.7
14.	Technical management skills.	2.8
a.	Dock lambs.	3.6
b.	Castrate lambs.	3.4
c.	Mark, notch, tag, or tattoo ears.	3.4
d.	Paint brands.	3.3
e.	Catch mature sheep with hands or crook.	3.1
f.	Trim feet.	3.0
g.	Restrain mature sheep.	2.6
h.	Exercise sheep.	2.6
i.	Care for sheep at sales or shows.	2.1
j.	Fit and show breeding sheep.	2.0
k.	Fit and show market lambs.	2.0
l.	Move camp.	1.8
15.	Predator control.	2.7
a.	Identify predator losses.	3.4
b.	Shoot predators.	3.2
c.	Develop a predator control program based on habits and life cycles of various predators.	3.0
d.	Properly use baits and poisons.	2.8
e.	Employ a trapper and direct his activities.	2.6
f.	Dispose of predator carcasses.	2.5
g.	Set traps.	2.3
h.	Construct predator proof enclosures.	2.2
16.	Lambing tasks.	2.7
a.	Assist ewes in lambing.	3.5
b.	Graft orphan lambs.	3.4
c.	Revive chilled lambs.	3.3
d.	Identify signs of approaching birth.	3.3
e.	Assist lambs in first nursing.	3.3
f.	Remove and dispose of dead lambs.	3.0
g.	Care for orphan lambs.	2.9
h.	Identify due dates of pregnant ewes.	2.8
i.	Isolate ewes for lambing.	2.7
j.	Paint newborn lamb's navel with iodine.	2.7
k.	Bed down pregnant ewes.	2.6
l.	Milk ewes.	2.6
m.	Administer artificial respiration to newborn lambs.	2.6
n.	Regulate temperature in lambing quarters.	2.3
o.	Remove afterbirth.	2.3
p.	Use lamb forceps.	1.7
q.	Skin dead lambs.	1.6

17.	Shearing.	2.6
a.	Properly store wool.	3.5
b.	Determine when to shear sheep.	3.5
c.	Contract with wool shearing firm.	3.1
d.	Clip ram for breeding.	2.8
e.	Tag ewes prior to lambing or breeding.	2.8
f.	Haul wool to market.	2.8
g.	Bundle and tie fleece.	2.7
h.	Supervise shearing crew.	2.7
i.	Shear wool with power driven clippers.	2.6
j.	Pack wool.	2.4
k.	Arrange for core testing of wool.	2.3
l.	Sharpen and adjust shears.	2.1
m.	Set up and test shearing equipment.	1.8
n.	Repair clippers.	1.7
18.	Legislative and service activities.	2.6
a.	Attend various association meetings or conventions.	2.9
b.	Attend field days or workshops conducted by governmental agencies or breed associations.	2.9
c.	Correspond with legislators.	2.7
d.	Interpret various bills.	2.7
e.	Develop resolutions for legislators.	2.6
f.	Testify before hearings.	2.5
g.	Conduct field days or judging contest for local youth groups or other breeders.	2.3
h.	Attend adult classes or young farmer meetings.	2.3
i.	Attend local service club meetings.	2.2
19.	Sheep herding.	2.5
a.	Guard flock against predators.	3.0
b.	Tend flock grazing on pasture or range.	2.6
c.	Tend flock on trail or highway.	2.5
d.	Work sheep dogs.	2.5
e.	Train sheep dogs.	2.2
f.	Care for horses.	2.1
20.	Slaughtering.	1.6
a.	Skin sheep.	1.7
b.	Slaughter sheep.	1.6
c.	Dress cut sheep.	1.6

SHEEP RANCH FOREMAN

Job Description:

The Sheep Ranch Foremen supervise and coordinate the activities of workers engaged in breeding, lambing, feeding, herding, predator control and in the construction and repair of fences, pens, and buildings using hand and power tools. They keep records and make some management decisions. Most of their activities are determined by the sheep rancher. They participate in marketing activities and have many health related tasks. They perform many technical duties such as castrating and docking and are responsible for some feed production and machinery operation and maintenance.

Competencies Identified and Validated

N = 38*

Competencies		Weighted Mean**
1.	Judging and selection.	3.1
a.	Determine condition of a flock or pen of sheep.	3.6
b.	Determine condition of teeth.	3.5
c.	Determine age.	3.5
d.	Identify defects.	3.5
e.	Cull breeding stock.	3.5
f.	Sort sheep according to size, weight, sex and condition.	3.4
g.	Remove incompatible sheep from flock.	3.3
h.	Identify various breeds.	2.9
i.	Identify points or traits which breed associations discriminate against.	2.8
j.	Attend breeding stock sales and purchases stock.	2.5
k.	Assist youth in selecting project animals or foundation stock.	1.9
2.	Supervision of workers and labor management.	3.1
a.	Plan work schedules.	3.5
b.	Suggest to employees improvements in methods of accomplishing work.	3.5
c.	Develop harmonious relationship with employees.	3.5
d.	Determine labor needed and prepare for peak work loads.	3.5
e.	Train employees.	3.5
f.	Assign employees according to skills and interests.	3.4
g.	Observe employee compliance to safety precautions.	3.3

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* Responses from 38 National Wool Growers and Sheep Producers in 27 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

h.	Judge prospective employee qualifications.	3.0
i.	Inform employees of benefits and responsibilities under regulatory laws.	2.9
j.	Develop employees' training programs.	2.8
k.	Hire and fire employees.	2.7
l.	Determine which regulatory laws concerning employees, apply to the operations.	2.7
m.	Negotiate specific arrangements with employees as to wages, hours, fringe benefits, etc.	2.4
3.	Technical management skills.	3.1
a.	Dock lambs.	3.7
b.	Castrate lambs.	3.6
c.	Paint brands.	3.2
d.	Catch mature sheep with hands or crook.	3.2
e.	Trim feet.	3.1
f.	Mark, notch, tag, or tatoo ears.	3.1
g.	Restrain mature sheep.	2.9
h.	Exercise sheep.	1.7
4.	Management decisions.	3.0
a.	Plan efficient utilization of feed, water, and storage facilities.	3.5
b.	Insure timeliness of all operations.	3.5
c.	Plan effective use of equipment.	3.4
d.	Determine cleaning and sanitation requirements for the operation.	3.3
e.	Plan the efficient utilization and layout of pens and shelters.	3.3
f.	Determine the best type of feeding program.	3.2
g.	Determine when to use professional services.	3.1
h.	Determine safety precautions to be observed.	3.1
i.	Balance rations for lambs on feed.	3.0
j.	Determine when to move camp.	3.0
k.	Arrange for transportation of sheep.	3.0
l.	Determine transportation needs.	2.9
m.	Plan the efficient utilization of all available resources such as water, timber, and rangeland.	2.8
n.	Read and interpret various lease and grazing agreements.	2.3
o.	Determine the value of land to rent or buy.	2.0
5.	Lambing tasks.	2.9
a.	Identify signs of approaching birth.	3.6
b.	Assist ewes in lambing.	3.4
c.	Graft orphan lambs.	3.2
d.	Revive chilled lambs.	3.2
e.	Assist lambs in first nursing.	3.2
f.	Care for orphan lambs.	3.0
g.	Identify due dates of pregnant ewes.	3.0

h.	Remove and dispose of dead lambs.	3.0
i.	Administer artificial respiration to newborn lambs.	3.0
j.	Paint newborn lamb's navel with iodine.	2.9
k.	Milk ewes.	2.8
l.	Isolate ewes for lambing.	2.8
m.	Regulate temperature in lambing quarters.	2.8
n.	Bed down pregnant ewes.	2.8
o.	Clean newborn lambs.	2.6
p.	Remove afterbirth.	2.6
q.	Use lamb forceps.	2.4
r.	Skin dead lambs.	2.2
6.	Feed and feeding.	2.9
a.	Determine proper amounts to feed various sheep.	3.5
b.	Determine water requirement for flock.	3.5
c.	Identify spoiled feed.	3.4
d.	Feed sheep.	3.4
e.	Determine when and what supplemental feed must be fed.	3.4
f.	Distribute salt and mineral blocks.	3.2
g.	Feed grazing sheep.	3.2
h.	Identify feeds.	3.2
i.	Check ewes' milk supply.	3.1
j.	Determine equipment needed to feed sheep.	3.1
k.	Clean and fill waterers.	3.1
l.	Feed lambs.	3.0
m.	Identify nutrient deficiencies in sheep.	3.0
n.	Flush ewes and rams.	2.9
o.	Interpret feed tags and labels.	2.9
p.	Interpret feed analysis reports.	2.8
q.	Determine nutrient requirements.	2.8
r.	Determine relative nutrient value of feedstuffs.	2.8
s.	Wean lambs.	2.8
t.	Load or unload bales of hay or bedding.	2.7
u.	Determine when lambs may be started on roughage and grain.	2.7
v.	Calculate feed efficiency.	2.6
w.	Develop and balance rations.	2.5
x.	Calculate cost of rations.	2.5
y.	Break up mineral or salt in mineral troughs or boxes.	2.4
z.	Mix feed.	2.0
aa.	Load or unload silage.	1.8
7.	Marketing (buying).	2.8
a.	Buy parts and supplies for machinery.	3.0
b.	Select and purchase drugs and veterinary supplies.	3.0
c.	Develop bill of materials.	2.9
d.	Buy supplies and materials.	2.9

e.	Buy feed at the best price.	2.8
f.	Buy groceries for herders and lambing help.	2.6
g.	Select and purchase desirable breeding stock.	2.6
h.	Select and purchase desirable lambs.	2.6
i.	Buy farm equipment and machinery.	2.3
8.	Predator control.	2.7
a.	Identify predator losses.	3.4
b.	Shoot various predators.	3.3
c.	Develop a predator control program based on habits and life cycles of various predators.	2.9
d.	Use baits and poisons.	2.7
e.	Set traps.	2.6
f.	Dispose of predator carcasses.	2.6
g.	Employ a trapper and direct his activities.	2.2
h.	Construct predator-proof enclosures.	2.2
9.	Record keeping.	2.7
a.	Maintain predator and other death losses.	3.5
b.	Count sheep.	3.4
c.	Keep equipment maintenance and repair records.	3.2
d.	Keep records of health, individual prevention, treatment and death.	3.0
e.	Keep personnel records.	3.0
f.	Maintain breeding records.	2.9
g.	Maintain production records.	2.7
h.	Keep purchases and sales records.	2.7
i.	Determine rate of gain.	2.5
j.	Interpret sire summaries.	2.3
k.	Maintain official production records.	2.3
l.	Keep financial records.	2.3
m.	Execute responsibility for payroll and withholding.	2.2
n.	Register breeding stock.	2.0
10.	Breeding tasks.	2.7
a.	Turn rams in with ewes.	3.4
b.	Determine ratio of rams per 100 ewes.	3.3
c.	Determine when to start and stop breeding season.	3.1
d.	Apply breeding harness to ram.	1.9
e.	Detect heat.	1.9
11.	Health program development.	2.[illegible]
a.	Identify symptoms of common diseases.	3.3
b.	Identify symptoms of common parasites.	3.3
c.	Interpret labels on medication.	3.2
d.	Vaccinate sheep.	3.2
e.	Identify injuries on sheep.	3.1
f.	Prevent common diseases and parasites.	3.1

g.	Determine when to rotate pastures to control diseases and parasites.	3.1
h.	Inspect sheep for defects.	3.0
i.	Worm sheep.	3.0
j.	Identify harmful or poisonous plants.	3.0
k.	Drench sheep.	2.8
l.	Store pesticides, vaccines, and medications.	2.8
m.	Develop a vaccination program.	2.8
n.	Check rams for epididymitis.	2.8
o.	Isolate sheep with transmissible diseases.	2.8
p.	Determine amounts of medication or materials needed in specific situations.	2.8
q.	Identify and correct sanitation problems.	2.7
r.	Pill sheep.	2.7
s.	Treat nicked or cut sheep.	2.6
t.	Supply medication through feed and water.	2.5
u.	Grub out or otherwise remove poisonous plants.	2.5
v.	Remove or bury dead animals.	2.4
w.	Spray sheep.	2.4
x.	Isolate newly purchased animals.	2.3
y.	Disinfect buildings and equipment.	2.3
z.	Precondition animals prior to shipment.	2.3
aa.	Remove manure from quarters or pens.	2.2
bb.	Calculate the cost of various health programs.	2.2
cc.	Bathe sheep in foot bath.	2.0
dd.	Dip sheep.	2.0
ee.	Take temperature.	1.9
ff.	Spread manure.	1.8
12.	Sheep herding.	2.6
a.	Guard flock against predators.	3.2
b.	Tend flock grazing on pasture or rangeland.	2.8
c.	Work sheep dog(s).	2.6
d.	Tend flock on trail or highway.	2.6
e.	Care for horses.	2.5
f.	Train sheep dog(s).	2.1
13.	Maintain and use hand and power tools.	2.5
a.	Instruct employees on safe use of hand and power tools.	2.9
b.	Read and interpret instructions on power tool operation.	2.7
c.	Identify tools.	2.7
d.	Use hand tools.	2.6
e.	Use power tools.	2.5
f.	Adjust power tools.	2.5
g.	Clean tools.	2.5
h.	Sharpen tools.	2.4
i.	Recondition tools.	1.9

14.	Feed production.		2.5
	a.	Determine range or pasture quality and quantity.	3.3
	b.	Control weeds or non-forage plants in pasture or rangeland.	2.9
	c.	Store feed crops.	2.4
	d.	Plant feed crops.	2.4
	e.	Harvest feed crops.	2.3
	f.	Cultivate feed crops.	2.2
	g.	Fertilize feed crops.	2.2
	h.	Irrigate feed crops.	2.0
15.	Machinery and equipment operation, maintenance and repair.		2.4
	a.	Develop a maintenance schedule for vehicles and equipment.	2.9
	b.	Inspect equipment for operating defects.	2.8
	c.	Operate a truck loaded with sheep.	2.8
	d.	Operate a feed truck.	2.8
	e.	Operate a tractor.	2.8
	f.	Grease and oil equipment.	2.7
	g.	Add coolant to cooling systems.	2.7
	h.	Read and interpret operator's manual or assembly diagrams.	2.7
	i.	Distribute feed in feed bunks.	2.7
	j.	Position truck for loading feed.	2.6
	k.	Inflate tires.	2.5
	l.	Install and adjust belts or chains.	2.5
	m.	Change oil and oil filters.	2.5
	n.	Identify hardware.	2.5
	o.	Install and service batteries.	2.4
	p.	Operate scales and record weights of feed.	2.4
	q.	Set up power clipper unit and other equipment for shearing.	2.4
	r.	Service fuel strainer, fuel filter, and sediment bowl.	2.3
	s.	Purchase clippers and clipper parts.	2.3
	t.	Service air cleaners.	2.3
	u.	Clean debris and dirt from vehicles.	2.3
	v.	Remove equipment from storage.	2.2
	w.	Prepare equipment for storage.	2.2
	x.	Replace radiator hoses.	2.2
	y.	Replace and adjust spark plugs.	2.2
	z.	Adjust carburetors.	2.2
	aa.	Repack bearings.	2.1
	bb.	Replace bearings and seals.	1.9
	cc.	Install carburetor repair kit.	1.9
	dd.	Time engine.	1.8
16.	Marketing (selling).		2.4
	a.	Properly load sheep.	3.6
	b.	Weigh sheep.	3.2
	c.	Estimate weight of lambs.	3.2

d.	Sort lambs by weight and grade.	3.0
e.	Prepare carriers for hauling sheep.	3.0
f.	Classify or grade sheep for marketing.	3.0
g.	Calculate shrinkage of sheep and of wool.	2.6
h.	Determine when to market sheep.	2.6
i.	Interpret market reports.	2.6
j.	Evaluate influence of market grade on net return.	2.4
k.	Determine marketing costs.	2.4
l.	Determine where to market sheep.	2.4
m.	Prepare advertisement for sale animals.	2.1
n.	Select a wool market.	2.1
o.	Calculate dressing percent.	2.1
p.	Take pictures of stock for advertising purposes.	1.9
q.	Identify wholesale and retail cuts.	1.8
r.	Consign breeding stock to sales.	1.5
s.	Conduct a sale.	1.5
17.	Wool shearing.	2.4
a.	Store wool.	3.4
b.	Determine when to shear sheep.	3.1
c.	Haul wool to market.	2.7
d.	Supervise sheep shearing crew.	2.6
e.	Tag ewes prior to lambing or breeding.	2.6
f.	Bundle and tie fleece.	2.5
g.	Contract with wool shearing firm.	2.4
h.	Shear wool with power driven clippers.	2.3
i.	Pack wool.	2.2
j.	Clip ram for breeding.	2.1
k.	Set up and test shearing equipment.	1.9
l.	Arrange for core testing of wool.	1.9
m.	Sharpen and adjust shears.	1.9
n.	Repair clippers.	1.6
18.	Construction and repair.	2.3
a.	Construct or repair permanent fences.	3.2
b.	Construct or repair temporary fences.	3.1
c.	Construct or repair feed racks, bunks, troughs, etc.	3.1
d.	Construct or repair and hang gates and doors.	2.9
e.	Replace valves in water system.	2.8
f.	Construct lambing pens (jugs).	2.6
g.	Replace fuses.	2.6
h.	Repair faucets.	2.5
i.	Repair electrical cords and broken wires.	2.5
j.	Repair leaks in roof of buildings.	2.5
k.	Determine the costs of construction.	2.4
l.	Replace water pipe.	2.4
m.	Wire simple electrical circuits.	2.3
n.	Replace belts and pulleys.	2.2
o.	Build and remove concrete forms.	2.2

p.	Replace window pane.	2.2
q.	Repair metal structures with arc welder.	2.1
r.	Develop a working drawing of a structure to be built.	2.1
s.	Replace electrical switches.	2.0
t.	Repair metal structures with oxyacetylene welder.	2.0
u.	Read and interpret blueprints.	2.0
v.	Construct a windbreak.	1.9
w.	Construct a foot path.	1.9
x.	Mix, pour, finish, and cure concrete.	1.8
y.	Construct a major structure (barn, building, or shelter).	1.8
z.	Repair sprinklers.	1.7
aa.	Lay concrete blocks.	1.5
19.	Miscellaneous management tasks.	2.3
a.	Provide camp with food and other necessities.	2.7
b.	Move camp or determine when to move camp.	2.5
c.	Attend field days or workshops conducted by government agencies or breed associations.	2.4
d.	Attend adult classes or young farmer meetings.	2.1
e.	Attend local service club meetings.	1.8
20.	Slaughtering.	1.6
a.	Skin sheep.	1.7
b.	Dress out sheep.	1.6
c.	Slaughter sheep.	1.6

SHEEP RANCH HAND

Other Titles: Farm Hand, Hired Man.

Job Description:

Sheep Ranch Hands are involved in a wide variety of farm and ranch chores. They are important in all operations where labor is important, especially during lambing season. They operate and maintain trucks and tractors and perform many routine feeding chores. They build fences and construct small farm and ranch projects such as feed racks and gates, using hand and power tools. They herd sheep and must control predators. They perform many health related chores including such tasks as castrating and docking.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Hand and power tools.	2.8
a.	Use power tools safely.	3.1
b.	Use hand tools safely.	3.1
c.	Clean tools.	3.0
d.	Identify tools.	2.9
e.	Read and interpret instructions on power tool operation.	2.9
f.	Sharpen tools.	2.8
g.	Adjust power tools.	2.6
h.	Recondition tools.	2.2
2.	Feed and feeding.	2.8
a.	Feed sheep.	3.2
b.	Check ewes' milk supply.	3.2
c.	Clean and fill waterers.	3.0
d.	Identify spoiled feed.	3.0
e.	Load or unload bales of hay or bedding.	2.9
f.	Identify feeds.	2.9
g.	Break up mineral and salt in mineral troughs or boxes.	2.8
h.	Determine proper amount of feed for various sheep.	2.8
i.	Wean lambs.	2.5
j.	Load or unload silage.	2.5
k.	Teach lambs to eat grain.	2.4

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* Responses from 37 National Wool Growers in 25 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	l.	Mix feed.	2.4
3.		Lambing tasks.	2.7
	a.	Assist lambs in first nursing.	3.2
	b.	Assist ewes in lambing.	3.2
	c.	Assist with abnormal births.	3.1
	d.	Revive chilled lambs.	3.1
	e.	Graft orphan lambs.	3.1
	f.	Identify signs of approaching birth.	3.1
	g.	Care for orphan lambs.	3.0
	h.	Remove and dispose of dead lambs.	3.0
	i.	Milk ewes.	2.8
	j.	Bed down pregnant ewes.	2.5
	k.	Paint newborn lamb's navel with iodine.	2.5
	l.	Administer artificial respiration to newborn lambs.	2.4
	m.	Clean newborn lambs.	2.3
	n.	Remove afterbirth.	2.3
	o.	Isolate ewes for lambing.	2.2
	p.	Identify due dates of pregnant ewes.	2.2
	q.	Skin dead lambs.	2.1
	r.	Regulate temperature in lambing quarters.	1.8
4.		Predator control.	2.6
	a.	Shoot predators.	3.3
	b.	Set traps.	2.5
	c.	Dispose of predator carcasses.	2.5
	d.	Construct predator proof enclosures.	2.2
5.		Machinery and equipment operation, maintenance and repair.	2.6
	a.	Inflate tires.	4.0
	b.	Grease and oil equipment.	4.0
	c.	Operate a feed truck.	3.9
	d.	Position truck for loading feed.	2.9
	e.	Operate a tractor.	2.9
	f.	Inspect equipment for operating defects.	2.9
	g.	Change oil and oil filters.	2.9
	h.	Add coolant to cooling system.	2.9
	i.	Distribute feed in feed bunks.	2.8
	j.	Install and adjust belts or chains.	2.8
	k.	Identify hardware.	2.8
	l.	Clean debris and dirt from vehicles.	2.8
	m.	Read and interpret operator's manual or assembly diagrams.	2.7
	n.	Service fuel strainer, fuel filter, and sediment bowl.	2.7
	o.	Operate a truck loaded with sheep.	2.7
	p.	Install and service batteries.	2.7
	q.	Prepare equipment for storage.	2.6
	r.	Replace radiator hose.	2.6

s.	Remove equipment from storage.	2.6
t.	Service air cleaners.	2.5
u.	Operate scales and record weights of feed.	2.4
v.	Repack bearings.	2.4
w.	Replace and adjust spark plugs.	2.4
x.	Replace bearings and seals.	2.1
y.	Adjust carburetors.	2.1
z.	Install carburetor repair kit.	2.0
aa.	Time engine.	1.9
6.	Sheep herding.	2.5
a.	Guard flock against predators.	3.0
b.	Tend flock on trail or highway.	2.7
c.	Work sheep dogs.	2.5
d.	Tend flock grazing on pasture or range.	2.5
e.	Train sheep dogs.	1.9
7.	Marketing skills.	2.5
a.	Load sheep.	3.1
b.	Count sheep.	2.9
c.	Prepare carriers for hauling sheep.	2.3
d.	Buy supplies.	1.7
8.	Develop a health program.	2.4
a.	Identify injuries on sheep.	3.1
b.	Identify symptoms of common diseases.	3.0
c.	Treat nicked or cut sheep.	2.8
d.	Identify symptoms of common parasites.	2.8
e.	Vaccinate sheep.	2.7
f.	Remove manure from quarters or pens.	2.7
g.	Identify poisonous plants.	2.6
h.	Isolate sheep with transmissible diseases.	2.6
i.	Worm sheep.	2.6
j.	Drench sheep.	2.6
k.	Pill sheep.	2.5
l.	Inspect sheep for defects.	2.5
m.	Store pesticides, vaccines, and medicines.	2.5
n.	Interpret labels on medicines, drugs, and pesiticide containers.	2.4
o.	Prevent common diseases and parasites.	2.4
p.	Spray sheep.	2.3
q.	Supply medicines through feed and water.	2.2
r.	Determine amounts of medication or materials needed in specific situations.	2.2
s.	Identify and correct sanitation problems.	2.2
t.	Grub out or otherwise remove poisonous plants.	2.2
u.	Disinfect buildings and equipment.	2.1
v.	Spread manure.	2.0
w.	Precondition animals prior to shipment.	2.0
x.	Dip sheep.	1.9
y.	Bathe sheep in foot bath.	1.8

	z.	Isolate newly purchased animals.	1.8
	aa.	Select and purchase drugs and other veterinary supplies.	1.8
9.		Producing feed.	2.4
	a.	Store feed crops.	2.6
	b.	Control weeds or non-forage plants in pasture or rangeland.	2.4
	c.	Harvest feed crops.	2.4
	d.	Cultivate feed crops.	2.4
	e.	Plant feed crops.	2.3
	f.	Fertilize feed crops.	2.2
	g.	Irrigate feed crops.	2.0
10.		Construction and repair.	2.4
	a.	Construct or repair permanent fences.	3.3
	b.	Construct or repair feed racks, bunks, troughs, etc.	3.2
	c.	Construct or repair temporary fences.	3.2
	d.	Construct or repair and hang gates.	2.8
	e.	Replace fuses.	2.7
	f.	Construct lambing pens (jugs).	2.6
	g.	Replace valves in water system.	2.5
	h.	Replace water pipe.	2.5
	i.	Repair faucets.	2.5
	j.	Repair leaks in roofs of buildings.	2.5
	k.	Replace belts and pulleys.	2.4
	l.	Construct a windbreak.	2.4
	m.	Replace window pane.	2.3
	n.	Repair electrical cords and broken wires.	2.2
	o.	Replace electrical switches.	2.2
	p.	Wire simple electrical circuits.	2.0
	q.	Repair sprinklers.	1.8
	r.	Repair metal structures with arc welder.	1.7
	s.	Repair metal structures with oxyacetylene welder.	1.7
	t.	Construct a foot bath.	1.7
	u.	Build and remove concrete forms.	1.6
11.		Technical management skills.	2.3
	a.	Catch mature sheep with hands or crook.	3.1
	b.	Dock lambs.	3.0
	c.	Paint brands.	2.9
	d.	Castrate lambs.	2.8
	e.	Sort sheep according to size, weight, sex, and condition.	2.8
	f.	Restrains mature sheep.	2.8
	g.	Mark, notch, tag, or tattoo sheep.	2.7
	h.	Determine condition of teeth.	2.7
	i.	Trim feet.	2.6
	j.	Tie fleece.	2.4

k.	Tag ewes prior to breeding or lambing.	2.0
l.	Shear sheep.	1.9
m.	Exercise sheep.	1.9
n.	Implant lambs.	1.8
o.	Care for sheep at sale or show.	1.8
p.	Repair clippers.	1.7
q.	Move camp.	1.6
r.	Sharpen clippers.	1.6
s.	Apply breeding harness to rams.	1.6
12.	Record keeping.	2.3
a.	Keep records of predator and other death losses.	2.7
b.	Keep personal records such as days worked.	2.5
c.	Use scales and record weights of crops, feed or sheep.	2.3
d.	Keep health records.	2.1
e.	Keep production records.	1.9

SHEEP HERDER

Other Titles: Shepherd, Sheepman, Mutton Puncher, Herder, and Herdsman.

Job Description:

Sheep Herders tend flocks of sheep grazing on range or pasture. They are very active with breeding and lambing chores and keep minor records. Providing the flock with feed, performing many technical tasks such as castrating and docking, and some fence construction and repair are all tasks performed by Herders. They operate some machinery when necessary.

Competencies Identified and Validated

N = 33*

Competencies		Weighted Mean**
1.	Predator control.	3.2
a.	Guard flock against predators.	3.7
b.	Identify predator losses.	3.6
c.	Shoot various predators.	3.5
d.	Properly use baits and poisons.	2.9
e.	Dispose of predator carcasses.	2.8
f.	Set traps.	2.7
2.	Construction and repair.	3.2
a.	Construct or repair permanent fences.	3.2
b.	Construct or repair temporary fences.	3.2
3.	Sheep herding.	3.1
a.	Tend flock on trail or highway.	3.3
b.	Observe flock for problem cases.	3.3
c.	Tend flock grazing on pasture or range.	3.2
d.	Search, locate and return stray sheep.	3.2
e.	Work sheep dogs.	3.0
f.	Select bedding ground for overnight stay.	2.9
g.	Determine range quality and quantity.	2.8
h.	Train sheep dogs.	2.7
4.	Feed and feeding.	3.0
a.	Feed sheep supplemental feed.	3.4
b.	Distribute salt and minerals.	3.4

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* Responses from 33 National Wool Growers and Sheep Producers in 21 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	c.	Clean and fill waterers.	3.2
	d.	Check ewes' milk supply.	3.1
	e.	Identify poisonous plants.	3.1
	f.	Determine when supplemental feed must be fed.	2.8
	g.	Identify nutrient deficiencies in sheep.	2.8
	h.	Wean lambs.	2.5
	i.	Flush ewes and lambs.	2.5
5.	Breeding and lambing.		2.9
	a.	Assist in lambing.	3.5
	b.	Graft orphan lambs.	3.5
	c.	Revive chilled lambs.	3.4
	d.	Assist lambs in first nursing	3.4
	e.	Identify signs of approaching birth.	3.3
	f.	Care for orphan lambs.	3.2
	g.	Turn rams in with ewes.	3.1
	h.	Remove rams from ewe flock.	3.0
	i.	Milk ewes.	2.9
	j.	Bed down pregnant ewes.	2.7
	k.	Remove afterbirth.	2.5
	l.	Paint navel with iodine.	2.4
	m.	Regulate temperature in lambing quarters.	2.4
	n.	Isolate ewes for lambing.	2.3
	o.	Clean newborn lambs.	2.3
6.	Judging and selection.		2.9
	a.	Determine condition of flock.	3.3
	b.	Identify defects in sheep.	3.1
	c.	Remove incompatible sheep from flock.	2.9
	d.	Determine condition of teeth.	2.9
	e.	Assist in sorting sheep according to size, weight, sex, and condition.	2.9
	f.	Assist in culling ewes.	2.7
	g.	Identify various breeds.	2.4
7.	Developing a health program.		2.9
	a.	Identify injuries on sheep.	3.4
	b.	Administer medication to sick sheep.	3.2
	c.	Identify symptoms of common diseases.	3.2
	d.	Identify symptoms of common parasites.	3.2
	e.	Isolate sheep with transmissible diseases.	3.1
	f.	Interpret labels on medications, drugs, and pesticide containers.	3.1
	g.	Remove or bury dead animals.	3.0
	h.	Vaccinate sheep.	2.9
	i.	Store pesticides, vaccines, and medications.	2.9
	j.	Treat nicked or cut sheep.	2.9
	k.	Worm sheep.	2.9
	l.	Determine amounts of medication or materials needed in specific situations.	2.8
	m.	Assist in spraying sheep.	2.8

n.	Drench sheep.	2.8
o.	Pill sheep.	2.7
p.	Grub out or otherwise remove poisonous plants.	2.5
q.	Isolate newly purchased animals.	2.5
r.	Precondition animals prior to shipment.	2.5
s.	Assist in dipping sheep.	2.4
8.	Technical management skills.	2.8
a.	Catch mature sheep with hands or crook.	3.2
b.	Paint brands on sheep.	3.1
c.	Dock lambs.	3.1
d.	Castrate lambs.	3.0
e.	Use power tools safely.	2.9
f.	Use hand tools safely.	2.9
g.	Assist in shearing sheep.	2.9
h.	Mark, notch, tag, or tattoo ears.	2.9
i.	Trim feet.	2.7
j.	Restrain mature sheep.	2.6
k.	Care for horses.	2.2
l.	Shoe horses.	1.5
9.	Record keeping.	2.7
a.	Maintain record of predator and other death losses.	3.4
b.	Maintain record of ammunition and other supplies needed.	3.0
c.	Keep personal records such as days worked.	2.7
d.	Keep lambing records.	2.5
e.	Maintain production records.	1.9
10.	Machinery and equipment operation, and maintenance.	2.5
a.	Operate a truck.	2.8
b.	Operate a tractor.	2.6
c.	Grease and oil equipment.	2.6
d.	Prepare equipment for storage.	2.0
11.	Slaughtering.	1.8
a.	Skin sheep.	2.0
b.	Dress cut sheep.	1.8
c.	Slaughter sheep.	1.7
d.	Prepare skin for market.	1.5

CAMP TENDER

Other Title: Camp Jack.

Job Description:

Camp Tenders supervise workers engaged in tending bands of sheep on range or pasture and keep them supplied with food and other necessities. They perform many technical management tasks, including moving camp. They make some management decisions including evaluating the condition of the sheep and the range. They keep some minor records.

Competencies Identified and Validated

N = 39*

Competencies			Weighted Mean**
1.	Management decisions.		3.0
	a.	Evaluate condition of sheep.	3.5
	b.	Evaluate condition of range.	3.3
	c.	Determine when to move to another location.	3.0
	d.	Determine carrying capacity.	2.9
	e.	Plan effective use of equipment and labor.	2.8
	f.	Designate area to be grazed by each sheep herder.	2.8
	g.	Determine transportation needs.	2.7
2.	Technical management tasks.		3.0
	a.	Shoot predators.	3.5
	b.	Move camp.	3.3
	c.	Transport feed, salt, and water to camp.	3.3
	d.	Drive truck.	3.3
	e.	Guard flock against predators.	3.2
	f.	Herd sheep.	3.1
	g.	Assist in herding band to new location.	3.1
	h.	Distribute salt and mineral blocks.	3.0
	i.	Deliver mail.	2.8
	j.	Set traps.	2.8
	k.	Care for horses.	2.8
	l.	Herd sheep.	2.6
	m.	Provide camp with wood.	2.5
	n.	Melt snow for camp use.	2.0
3.	Purchasing tasks.		2.8

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* Responses from 39 National Wool Growers and Sheep Producers in 23 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a.	Maintain storage of supplies and feed needed by sheep herders.	2.9
	b.	Purchase salt and supplemental feed for range sheep.	2.7
	c.	Purchase food, fuel, ammunition, and supplies for sheep herders.	2.6
4.	Supervision of workers and labor management.		2.7
	a.	Observe employee compliance to safety precautions.	3.0
	b.	Develop harmonious relationships with workers.	2.8
	c.	Suggest to workers improvements in methods of accomplishing work.	2.7
	d.	Plan work schedules.	2.6
	e.	Train employees.	2.5
	f.	Assign workers according to skills and interests.	2.5
	g.	Inform employees of benefits and responsibilities under regulatory laws.	2.2
5.	Keep records.		2.3
	a.	Keep records of supplies purchased, on hand, and consumed.	2.8
	b	Keep personnel records.	2.6
	c.	Keep personal records such as days worked.	2.6
	d.	Maintain a journal.	2.1
	e.	Execute responsibility for payroll and withholding.	1.8
	f.	Prepare a budget for each camp.	1.8

LAMB FEEDER

Job Description:

Lamb Feeders feed lambs for market in a confined feedlot environment. They are responsible for the success or failure of the feedlot operation and make all critical management decisions. These decisions include those in marketing, feed production, feeding, shearing, and the health program. They keep records and supervise all labor and operations on the feed-lot. They construct facilities and equipment using hand and power tools. They operate and maintain power machinery and equipment. They may also perform legislative and service activities.

Competencies Identified and Validated

N = 48*

Competencies	Weighted Mean**
1. Management decisions.	3.3
a. Balance rations for lambs on feed.	3.6
b. Plan efficient utilization of feed, water, and storage facilities.	3.6
c. Determine the best type of feeding program.	3.6
d. Determine cleaning and sanitation requirements for the operation.	3.4
e. Plan the efficient utilization of all available resources.	3.4
f. Insure timeliness of all operations.	3.4
g. Determine when to use professional services.	3.4
h. Plan the efficient utilization and layout of pens and shelters.	3.3
i. Arrange for transportation of sheep.	3.3
j. Determine long and short term goals of the operation.	3.2
k. Determine transportation needs.	3.2
l. Plan effective use of equipment.	3.2
m. Determine the value of land to rent or buy.	3.1
n. Determine safety precautions to be observed.	3.0
o. Plan the insurance program for the operation.	2.8
2. Marketing (buying).	3.2
a. Select and purchase lambs.	3.5
b. Buy feed.	3.4

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* Responses from 48 Lamb Feeders in 19 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	c.	Select and purchase drugs and veterinary supplies.	3.3
	d.	Buy supplies.	3.2
	e.	Buy farm equipment and machinery.	3.0
	f.	Develop bill of materials.	3.0
3.	Feed and feeding.		3.2
	a.	Develop and balance rations.	3.6
	b.	Identify nutrient deficiencies in lambs.	3.5
	c.	Identify spoiled feed.	3.5
	d.	Determine proper amounts to feed various pens of lambs.	3.5
	e.	Determine nutrient requirements.	3.5
	f.	Calculate feed efficiency.	3.5
	g.	Determine relative nutrient value of feedstuffs.	3.5
	h.	Determine water requirements for lambs.	3.5
	i.	Calculate cost of rations.	3.5
	j.	Interpret feed analysis reports.	3.4
	k.	Interpret feed tags and labels.	3.4
	l.	Determine equipment needed to feed lambs.	3.4
	m.	Distribute salt and minerals.	3.4
	n.	Clean and fill waterers.	3.4
	o.	Identify feeds.	3.3
	p.	Feed lambs.	3.3
	q.	Mix feed.	2.8
	r.	Load or unload bales of hay or bedding.	2.7
	s.	Break up minerals or salt in mineral troughs or boxes.	2.4
	t.	Load or unload silage.	2.0
4.	Shearing lambs.		3.2
	a.	Store wool.	3.4
	b.	Determine when to shear sheep.	3.3
	c.	Contract with wool shearing firm.	3.3
	d.	Supervise shearing crew.	2.8
5.	Record keeping.		3.2
	a.	Keep financial records.	3.7
	b.	Keep purchase and sales records.	3.6
	c.	Determine rate of gain.	3.5
	d.	Keep record of vaccinations, disease treatment, and death losses.	3.5
	e.	Use scales and record weights of crops, feed, or sheep.	3.5
	f.	Keep livestock and equipment inventories.	3.5
	g.	Set up and maintain record keeping systems.	3.4
	h.	Keep production records.	3.4
	i.	Determine efficiency of production.	3.4
	j.	Keep records of feed fed.	3.4
	k.	Determine marketing costs.	3.3
	l.	Calculate return on wool.	3.2

	m.	Keep records of pens fed.	3.2
	n.	Keep record of costs involved in disease and injury prevention and treatment.	3.1
	o.	Keep personal records.	2.9
	p.	Determine net worth of the operation.	2.9
	q.	Assist accountant in preparing tax return.	2.9
	r.	Figure depreciation.	2.8
	s.	Keep personnel records.	2.8
	t.	Keep equipment maintenance and repair records.	2.8
	u.	Execute responsibility for payroll and withholding.	2.7
	v.	Prepare a budget.	2.6
6.	Develop a health program.		3.2
	a.	Determine amounts of medicines or materials needed in specific situations.	3.8
	b.	Develop a vaccination program.	3.7
	c.	Isolate sheep with transmissible diseases.	3.6
	d.	Identify symptoms of common diseases.	3.5
	e.	Identify symptoms of common parasites.	3.5
	f.	Supervise the total health program.	3.5
	g.	Prevent common diseases and parasites.	3.5
	h.	Interpret labels on medicines, drugs, and pesticide containers.	3.4
	i.	Inspect sheep for defects.	3.4
	j.	Remove or bury dead animals.	3.4
	k.	Identify and correct sanitation problems.	3.4
	l.	Vaccinate sheep.	3.4
	m.	Worm sheep.	3.4
	n.	Supply medication through feed and water.	3.3
	o.	Store pesticides, vaccines, and medicines.	3.3
	p.	Isolate newly purchased animals.	3.2
	q.	Drench sheep.	3.2
	r.	Calculate the cost of various health programs.	3.2
	s.	Remove manure from quarters or pens.	3.0
	t.	Pill sheep.	3.0
	u.	Identify poisonous plants.	2.9
	v.	Disinfect building and equipment.	2.8
	w.	Treat nicked or cut sheep.	2.8
	x.	Spread manure.	2.7
	y.	Take temperature.	2.6
	z.	Make worm egg counts.	2.6
	aa.	Dip sheep.	2.5
	bb.	Spray sheep.	2.4
	cc.	Take a blood sample.	2.4
7.	Marketing (selling).		3.1
	a.	Prepare carriers for hauling lambs.	3.9
	b.	Determine when to market lambs.	3.6
	c.	Determine where to market lambs.	3.6
	d.	Properly load lambs.	3.5
	e.	Establish good relations with packer.	3.4

	f.	Weigh lambs.	3.4
	g.	Sort lambs by weight and grade.	3.4
	h.	Classify or grade lambs for marketing.	3.4
	i.	Evaluate influence of market grade on net return.	3.4
	j.	Interpret market reports.	3.4
	k.	Estimate weight of lambs.	3.3
	l.	Calculate shrinkage of lambs and of wool.	3.2
	m.	Select a wool market.	3.1
	n.	Calculate dressing percent.	3.1
	o.	Conduct a sale.	2.3
	p.	Grade wool.	2.2
	q.	Prepare advertisement for sale of lambs.	2.0
	r.	Identify wholesale and retail cuts.	2.0
8.	Supervise workers and labor management.		3.0
	a.	Hire and fire employees.	3.3
	b.	Determine labor needed and prepare for peak work loads.	3.2
	c.	Train employees.	3.2
	d.	Develop harmonious relationships with workers.	3.2
	e.	Suggest to workers improvements in methods of accomplishing work.	3.1
	f.	Plan work schedules.	3.1
	g.	Observe employee compliance to safety precautions.	3.1
	h.	Judge prospective employee qualifications.	3.1
	i.	Negotiate specific arrangements with employees as to wages, hours, fringe benefits, etc.	3.0
	j.	Assign workers according to skills and interests.	3.0
	k.	Determine which regulatory laws concerning employees, apply to the operation.	2.8
	l.	Inform employees of benefits and responsibilities under regulatory laws.	2.7
	m.	Develop workers' training programs.	2.7
9.	Judging and selection.		3.0
	a.	Determine condition of a pen of lambs.	3.6
	b.	Identify defects.	3.2
	c.	Determine which breed(s) or type of lambs are best suited to the local situation.	3.2
	d.	Identify breeds.	2.7
	e.	Identify body parts.	2.5
10.	Machinery and equipment operation, maintenance, and repair.		2.7
	a.	Operate scales and record weights of feed.	3.0
	b.	Develop a maintenance schedule for vehicles and equipment.	3.0
	c.	Read and interpret operator's manual or assembly diagrams.	3.0

d.	Inspect equipment for operating defects.	3.0
e.	Purchase parts and supplies for equipment.	2.9
f.	Distribute feed in feed bunks.	2.9
g.	Grease and oil equipment.	2.9
h.	Identify hardware.	2.8
i.	Operate a feed truck.	2.8
j.	Install and adjust belts or chains.	2.8
k.	Add coolant to cooling systems.	2.8
l.	Change oil and oil filters.	2.7
m.	Inflate tires.	2.7
n.	Operate a tractor.	2.7
o.	Position truck for loading feed.	2.7
p.	Service air cleaners.	2.6
q.	Service fuel strainer, fuel filter and sediment bowl.	2.6
r.	Prepare equipment for storage.	2.5
s.	Clean debris and dirt from vehicles.	2.6
t.	Remove equipment from storage.	2.5
u.	Replace bearings and seals.	2.5
v.	Adjust carburetors.	2.5
w.	Replace radiator hoses.	2.4
x.	Repack bearings.	2.4
y.	Replace and adjust spark plugs.	2.4
z.	Operate a truck loaded with sheep.	2.3
aa.	Install carburetor repair kit.	2.2
bb.	Time engines.	2.0
11.	Maintain and use hand and power tools.	2.6
a.	Read and interpret instructions on power tool operation.	2.7
b.	Clean tools.	2.6
c.	Use power tools.	2.6
d.	Identify tools.	2.6
e.	Adjust power tools.	2.6
f.	Sharpen tools.	2.5
12.	Construction and repair.	2.6
a.	Purchase materials.	3.2
b.	Determine the costs of construction and repairs.	3.1
c.	Develop a bill of materials.	3.0
d.	Construct or repair permanent fences.	2.8
e.	Construct or repair feeders, bunks, troughs, etc.	2.8
f.	Construct or repair temporary fences.	2.8
g.	Repair electrical cords and broken wires.	2.8
h.	Replace valves in water system.	2.8
i.	Construct or repair and hang gates and doors.	2.8
j.	Develop a working drawing of a structure to be built.	2.7
k.	Repair leaks in roof of buildings.	2.7
l.	Replace fuses.	2.7

m.	Repair faucets.	2.7
n.	Replace water pipe.	2.6
o.	Replace belts and pulleys.	2.6
p.	Read and interpret blueprints.	2.6
q.	Replace electrical switches.	2.4
r.	Wire simple electrical circuits.	2.4
s.	Construct a windbreak.	2.3
t.	Replace window pane.	2.3
u.	Build and remove concrete forms.	2.3
v.	Repair metal structures with arc welder.	2.2
w.	Repair metal structures with oxacetylene welder.	2.1
x.	Repair sprinklers.	1.8
y.	Construct a major structure.	1.8
13.	Feed production.	2.2
a.	Store feed crops.	2.4
b.	Harvest feed crops.	2.4
c.	Cultivate feed crops.	2.4
d.	Plant feed crops.	2.3
e.	Fertilize feed crops.	2.3
f.	Irrigate feed crops.	1.7
14.	Legislative and service activities.	2.1
a.	Attend various association meetings or conventions.	2.5
b.	Attend field days or workshops conducted by government agencies or producer organizations.	2.3
c.	Correspond with legislators.	2.3
d.	Interpret various bills.	2.0
e.	Testify before hearings.	2.0
f.	Develop resolutions for legislators.	1.9
g.	Conduct field days or judging contests for local youth groups.	1.9
h.	Attend adult classes or young farmer meetings.	1.9
i.	Attend local service club meetings.	1.8

FEEDLOT FOREMAN

Job Description:

Feedlot Foremen supervise and coordinate the activities of workers engaged in feeding and caring for lambs on feed. They make many management decisions, and are responsible for the feeding and the health program. They keep various records and are involved in several marketing activities, including some judging and selection. They supervise and assist in the construction and repair of pens, shelters, and other feedlot facilities. They operate, repair, and maintain various pieces of equipment and machinery.

Competencies Identified and Validated

N = 44*

Competencies	Weighted Mean**
1. Management decisions.	3.1
a. Insure timeliness of all operations.	3.5
b. Determine when to use professional services.	3.4
c. Plan efficient utilization of feed, water, and storage facilities.	3.3
d. Plan effective use of equipment.	3.2
e. Determine safety precautions to be observed.	3.1
f. Plan the efficient utilization of and layout of pens and shelters.	3.1
g. Plan the efficient utilization of all available resources.	3.1
2. Supervision of workers and labor management.	3.0
a. Plan work schedules.	3.4
b. Determine labor needed and prepare for peak work loads.	3.4
c. Suggest to workers improvements in methods of accomplishing work.	3.4
d. Develop harmonious relationships with workers.	3.4
e. Observe employee compliance to safety precautions.	3.4
f. Assign workers according to skills and interests.	3.4
g. Train employees.	3.4
h. Develop workers' training programs.	3.1
i. Inform employees of benefits and responsibilities under regulatory laws.	2.9

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* Responses from 44 members of the National Lamb Feeders Association in 19 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

j.	Hire and fire employees.	2.5
k.	Negotiate specific arrangements with employees as to wages, hours, fringe benefits, etc.	2.4
l.	Determine which regulatory laws concerning employees, apply to the operation.	2.3
m.	Judge prospective employee qualifications.	2.2
3.	Developing a health program.	2.9
a.	Identify symptoms of common diseases.	3.5
b.	Identify symptoms of common parasites.	3.4
c.	Identify injuries on sheep.	3.3
d.	Prevent common diseases and parasites.	3.3
e.	Isolate sheep with transmissible diseases.	3.3
f.	Interpret labels on medication, drugs, and pesticide containers.	3.3
g.	Isolate newly purchased animals.	3.2
h.	Determine amounts of medicine or materials needed in specific situations.	3.2
i.	Inspect sheep for defects.	3.2
j.	Identify and correct sanitation problems.	3.1
k.	Vaccinate sheep.	3.1
l.	Develop a vaccination program.	3.1
m.	Worm sheep.	3.0
n.	Supply medicines through feed and water.	3.0
o.	Store pesticides, vaccines, and medicines.	3.0
p.	Supervise the total health program.	3.0
q.	Drench sheep.	2.9
r.	Select and purchase drugs and other veterinary supplies.	2.8
s.	Remove or bury dead animals.	2.8
t.	Treat nicked or cut sheep.	2.8
u.	Pill sheep.	2.7
v.	Disinfect buildings and equipment.	2.6
w.	Calculate the cost of various health programs.	2.5
x.	Remove manure from quarters or pens.	2.5
y.	Take temperature.	2.4
z.	Spray sheep.	2.4
aa.	Trim feet.	2.1
bb.	Spread manure.	2.0
4.	Feed and feeding.	2.9
a.	Identify spoiled feed.	3.5
b.	Determine proper amount to feed various pens of lambs.	3.5
c.	Identify nutrient deficiencies in lambs.	3.2
d.	Identify feeds.	3.1
e.	Distribute salt and minerals.	3.1
f.	Feed lambs.	3.1
g.	Determine equipment needed to feed lambs.	3.0
h.	Develop and balance rations.	2.9
i.	Determine nutrient requirements.	2.8

	j.	Interpret feed tags and labels.	2.8
	k.	Clean and fill waterers.	2.8
	l.	Interpret feed analysis reports.	2.8
	m.	Calculate feed efficiency.	2.8
	n.	Calculate cost of rations.	2.8
	o.	Determine relative nutrient value of feedstuffs.	2.8
	p.	Classify feeds.	2.7
	q.	Mix feed.	2.7
	r.	Load or unload bales of hay or bedding.	2.5
	s.	Break up minerals or salt in mineral troughs or boxes.	2.4
	t.	Load or unload silage.	2.1
5.	Judging and selection.		2.9
	a.	Use scales and record weights.	3.4
	b.	Keep health records.	3.4
	c.	Keep feed records.	3.1
	d.	Keep equipment maintenance and repair records.	3.1
	e.	Keep record of costs involved in disease and injury prevention and treatment.	3.1
	f.	Determine rate of gain.	3.0
	g.	Keep personnel records.	2.9
	h.	Keep livestock and equipment records.	3.8
	i.	Maintain production records.	2.8
	j.	Determine efficiency of production.	2.8
	k.	Maintain personal records such as days worked.	2.8
	l.	Keep purchase and sales records.	2.3
	m.	Maintain financial records.	2.3
	n.	Determine market costs.	2.1
	o.	Execute responsibility for payroll and withholding.	2.0
6.	Marketing.		2.8
	a.	Weigh lambs.	3.2
	b.	Properly load lambs.	3.2
	c.	Estimate weight of lambs.	3.1
	d.	Sort lambs by weight and grade.	3.1
	e.	Classify or grade lambs for marketing.	2.9
	f.	Buy supplies.	2.7
	g.	Select and purchase drugs.	2.7
	h.	Develop bill of materials.	2.5
	i.	Calculate shrinkage of lambs and of wool.	2.5
	j.	Prepare carriers for hauling lambs.	2.4
	k.	Determine when to market lambs.	2.4
7.	Maintaining and using hand and power tools.		2.8
	a.	Read and interpret instructions on power tool operation.	3.0
	b.	Identify tools.	2.9
	c.	Use power tools.	2.9

d.	Adjust power tools.	2.8
e.	Clean tools.	2.8
f.	Sharpen tools.	2.7
g.	Recondition tools.	2.3
8.	Machinery and equipment operation, maintenance, and repair.	2.6
a.	Operate scales and record weights of feed.	3.2
b.	Inspect equipment for operating defects.	3.1
c.	Develop a maintenance schedule for vehicles and equipment.	2.9
d.	Read and interpret operator's manual or assembly diagrams.	2.9
e.	Identify hardware.	2.9
f.	Operate a tractor.	2.9
g.	Purchase parts and supplies for equipment.	2.7
h.	Grease and oil equipment.	2.7
i.	Add coolant to cooling systems.	2.7
j.	Distribute feed in feed bunks.	2.7
k.	Operate a feed truck.	2.6
l.	Position truck for loading feed.	2.6
m.	Inflate tires.	2.5
n.	Change oil and oil filters.	2.5
o.	Clean debris and dirt from vehicles.	2.5
p.	Install and adjust belts or chains.	2.5
q.	Operate a truck loaded with sheep.	2.5
r.	Service air cleaners.	2.5
s.	Service fuel strainer, fuel filter, and sediment bowl.	2.5
t.	Prepare equipment for storage.	2.5
u.	Remove equipment from storage.	2.4
v.	Install and service battery.	2.4
w.	Replace radiator hoses.	2.3
x.	Repack bearings.	2.3
y.	Replace and adjust spark plugs.	2.3
z.	Replace bearings and seals.	2.3
aa.	Adjust carburetors.	2.2
9.	Construction and repair.	2.4
a.	Construct or repair temporary fences.	2.8
b.	Construct or repair feeders, bunks, troughs, etc.	2.8
c.	Construct or repair permanent fences.	2.8
d.	Construct or repair and hang gates and doors.	2.8
e.	Replace valves in water.	2.7
f.	Replace fuses.	2.7
g.	Repair faucets.	2.6
h.	Repair electrical cords and broken wires.	2.5
i.	Replace water pipe.	2.5
j.	Replace electrical switches.	2.4
k.	Repair leaks in roof of buildings.	2.4

l.	Replace belts and pulleys.	2.4
m.	Develop a bill of materials.	2.3
n.	Determine the costs of construction and repairs.	2.3
o.	Repair metal structures with oxyacetylene welder.	2.3
p.	Purchase materials.	2.3
q.	Repair metal structures with arc welder.	2.3
r.	Wire simple electrical circuits.	2.3
s.	Replace window pane.	2.1
t.	Construct a windbreak.	2.0
u.	Repair sprinklers.	1.9
10.	Feed production.	1.8
a.	Store feed crops.	2.0
b.	Plant feed crops.	1.8
c.	Cultivate feed crops.	1.8
d.	Harvest feed crops.	1.8
e.	Fertilize feed crops.	1.7

FEEDLOT LABORER

Job Description:

Feedlot Laborers perform many of the common chores necessary in the feeding of lambs, including feeding, feed production, and construction and repair of fences, gates, and other structures. They are essential in all operations where labor is critical and operate and maintain machinery and vehicles. They maintain and use various hand and power tools and assist with the health program.

Competencies Identified and Validated

N = 39*

	Competencies	Weighted Mean**
1.	Construction and repair.	3.2
a.	Construct or repair permanent fences.	3.4
b.	Construct or repair feeders, bunks, troughs, etc.	3.4
c.	Construct or repair and hang gates and doors.	3.4
d.	Construct or repair temporary fences.	3.4
e.	Replace fuses.	3.3
f.	Replace valves in water system.	3.2
g.	Replace belts and pulleys.	3.2
h.	Repair leaks in roof of buildings.	3.1
i.	Repair faucets.	3.1
j.	Repair electrical cords and broken wires.	2.9
2.	Machinery and equipment operation, maintenance, and repair.	3.2
a.	Add coolant to cooling systems.	3.5
b.	Inflate tires.	3.5
c.	Distribute feed in bunks.	3.4
d.	Position truck for loading feed.	3.4
e.	Operate a feed truck.	3.4
f.	Clean debris and dirt from vehicles.	3.4
g.	Grease and oil equipment.	3.4
h.	Load lambs.	3.4
i.	Operate a tractor.	3.3
j.	Change oil and oil filters.	3.3
k.	Install and adjust belts or chains.	3.3
l.	Inspect equipment for operating defects.	3.3
m.	Install and service battery.	3.2
n.	Operate scales and record weights of feed.	3.2

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* Responses from 39 National Wool Growers and Sheep Producers in 21 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	o.	Prepare equipment for storage.	3.2
	p.	Remove equipment from storage.	3.2
	q.	Service air cleaners.	3.1
	r.	Service fuel strainer, fuel filter, and sediment bowl.	3.1
	s.	Replace radiator hoses.	3.1
	t.	Read and interpret operator's manual or assembly diagrams.	3.0
	u.	Replace and adjust spark plugs.	3.0
	v.	Prepare carriers for hauling.	2.7
	w.	Operate a truck loaded with sheep.	2.6
3.	Feeds and feeding.		3.1
	a.	Clean and fill waterers.	3.6
	b.	Feed lambs.	3.5
	c.	Identify spoiled feeds.	3.4
	d.	Distribute salt and minerals.	3.3
	e.	Load or unload bales of hay or bedding.	3.3
	f.	Mix feed.	3.2
	g.	Break up mineral or salt in mineral troughs or boxes.	3.1
	h.	Identify feeds.	3.1
	i.	Load or unload silage.	3.0
	j.	Determine proper amounts to feed various pens of lambs.	2.7
	k.	Keep feed records.	2.3
4.	Hand and power Tools.		3.1
	a.	Identify tools.	3.2
	b.	Clean tools.	3.2
	c.	Use power tools.	3.2
	d.	Read and interpret instructions on power tool operation.	3.1
	e.	Adjust power tools.	3.1
	f.	Sharpen tools.	2.9
5.	Health related tasks.		2.8
	a.	Remove or bury dead lambs.	3.3
	b.	Remove manure from pens.	3.2
	c.	Vaccinate lambs.	3.2
	d.	Isolate lambs with transmissible diseases.	3.0
	e.	Disinfect buildings and equipment.	3.0
	f.	Treat nicked or cut lambs.	2.9
	g.	Spread manure.	2.9
	h.	Store pesticides, vaccines, and medicines.	2.9
	i.	Identify symptoms of common diseases.	2.9
	j.	Pill lambs.	2.8
	k.	Supply medicines through feed and water.	2.7
	l.	Identify symptoms of common parasites.	2.7
	m.	Inspect lambs for defects.	2.6
	n.	Interpret labels on medicines and drugs and pesticide containers.	2.5
	o.	Determine condition of a pen of lambs.	2.4

	p. Prevent common diseases and parasites.	2.4
	q. Keep health records including treatment and death losses.	2.3
	r. Identify defects.	2.2
6.	Feed production.	2.6
	a. Harvest feed crops.	2.7
	b. Cultivate feed crops.	2.6
	c. Fertilize feed crops.	2.6
	d. Irrigate feed crops.	2.4

SHEEP SHEARER

Other Titles: Sheep Clipper, Stock Clipper, Wool Shearer.

Job Description:

Sheep Shearers shear wool from live sheep using power-driven clippers. They maintain, repair, and sharpen their clippers and keep records of their shearing. They assist in setting up and disassembling the shearing equipment.

Competencies Identified and Validated

N = 90*

Competencies		Weighted Mean**
1.	Record keeping.	3.3
a.	Keep record of sheep shorn.	3.4
b.	Keep personal records.	3.3
2.	Wool shearing.	2.8
a.	Shear wool with power driven clippers.	3.8
b.	Oil clippers.	3.8
c.	Adjust clippers.	3.8
d.	Repair clippers.	3.6
e.	Sharpen clipper blades.	3.5
f.	Assist in setting up and testing power clipper units and other equipment for shearing.	3.2
g.	Assist in disassembling and storing shearing set up.	3.1
h.	Clean up shearing area.	2.8
i.	Doctor nicks and cuts caused from shearing.	2.8
j.	Fold and tie fleece into bundle.	2.1
k.	Assist in herding sheep up to shearing area.	2.0
l.	Herd shorn sheep into runway leading to pen.	1.9
m.	Sack wool.	1.9
n.	Tie wool sacks.	1.8
o.	Load wool sacks into truck.	1.5

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* Responses from 90 Sheep Shearers and Contract Sheep Shearers in 24 states. Survey conducted by the Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

CONTRACT SHEEP SHEARER - CAPTAIN

Job Description:

Contract Sheep Shearers contract with sheep producers to shear their sheep. They and their crew shear the sheep using power driven clippers. Contract Sheep Shearers supervise the crew and perform several management tasks to insure the efficient use of labor and equipment. They keep accurate records and purchase supplies and equipment.

Competencies Identified and Validated

N = 87*

Competencies	Weighted Mean**
1. Power tool use and maintenance.	3.3
a. Clean and repair clippers.	3.6
b. Sharpen clipper blades.	3.5
c. Inspect and test clippers and power sources.	3.2
d. Identify tools.	3.2
e. Instruct employees on proper clipper repair techniques.	3.1
2. Record keeping.	3.1
a. Keep record of number of sheep shorn.	3.5
b. Maintain equipment maintenance and repair records.	3.4
c. Submit bills to wool growers for shearing services.	3.3
d. Keep personal records.	3.3
e. Set up and maintain financial record keeping systems.	3.3
f. Keep personnel records.	3.1
g. Maintain transportation records.	2.9
h. Write and interpret contracts with wool growers.	2.8
i. Keep individual performance records for each shearer.	2.7
j. Assist accountant in preparing tax return.	2.7
k. Execute responsibility in payroll and withholding.	2.6
3. Supervise workers and labor management.	3.0
a. Plan work schedules.	3.5
b. Determine labor needed and prepare for peak work loads.	3.5
c. Develop harmonious relationships with workers.	3.3
d. Suggest to workers improvements in methods of accomplishing work.	3.2

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* Responses from 87 Sheep Shearers and Contract Sheep Shearers in 24 states. Survey conducted by Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	e.	Hire and fire employees.	3.2
	f.	Train employees.	3.1
	g.	Observe employee compliance to safety precautions.	3.1
	h.	Judge prospective employee qualifications.	3.0
	i.	Negotiate specific arrangements with employees as to wages, hours, fringe benefits, etc.	3.0
	j.	Assign workers according to skills and interests.	2.9
	k.	Determine which regulatory laws concerning employees, apply to the operation.	2.7
	l.	Inform employees of benefits and responsibilities under regulatory laws.	2.6
	m.	Develop workers' training programs.	2.4
4.	Management decisions.		2.9
	a.	Plan effective use of equipment.	3.4
	b.	Negotiate contracts with wool growers.	3.3
	c.	Insure timeliness of all operations.	3.1
	d.	Plan transportation needs.	3.1
	e.	Determine long and short term goals for the business.	2.9
	f.	Plan for meals for crew.	2.8
	g.	Plan for housing for crew.	2.6
	h.	Plan for the insurance program for the operation.	2.3
5.	Wool shearing.		2.9
	a.	Shear wool with power driven clippers.	3.7
	b.	Set up and test power clipper unit and other equipment for shearing.	3.7
	c.	Supervise sheep shearing crew.	3.2
	d.	Insure even flow of sheep to each shearer.	3.2
	e.	Oil and adjust clippers.	3.1
	f.	Disassemble and store shearing set up.	3.1
	g.	Properly store wool.	3.1
	h.	Clean up shearing area.	3.0
	i.	Fold and tie fleece into bundle.	3.0
	j.	Provide shearers with clippers, sharp blades, oil, etc.	3.0
	k.	Perform first aid on crew members.	2.8
	l.	Doctor cuts and nicks caused from shearing.	2.8
	m.	Sack wool.	2.6
	n.	Tie wool sacks.	2.5
	o.	Assist in herding sheep up to shearing area.	2.3
	p.	Herd shorn sheep into runway leading to pen.	2.1
	q.	Load wool sacks into truck.	1.7
6.	Machinery and equipment operation, maintenance and repair.		2.8
	a.	Inspect equipment for operating defects.	3.3
	b.	Grease and oil equipment.	3.0

	c.	Repair clipper power generating unit.	2.7
	d.	Operate bus and/or truck.	2.5
	e.	Service vehicles.	2.3
7.	Construction and repair.		2.8
	a.	Repair electrical cords and broken wires.	3.3
	b.	Replace belts and pulleys.	3.0
	c.	Determine the costs of construction and repairs.	2.9
	d.	Develop a bill of materials.	2.8
	e.	Construct restraining pens and gates to facilitate shearing.	2.5
	f.	Repair metal structures with arc or oxyacetylene welder.	2.1
8.	Purchasing supplies and equipment.		2.7
	a.	Purchase supplies.	3.3
	b.	Purchase clippers and other shearing equipment and supplies.	3.2
	c.	Purchase or contract for transportation vehicles.	2.5
	d.	Purchase meals for employees.	2.2
	e.	Provide lodging for employees.	2.2
9.	Public relations and service activities.		2.0
	a.	Attend various association meetings or conventions.	2.3
	b.	Attend field days or workshops conducted by governmental agencies.	2.0
	c.	Attend local service club meetings.	2.0
	d.	Attend adult classes or young farmer meetings.	1.9

SMALL ANIMAL SUPPLIER

Other Titles: Small Animal Farmer, Laboratory Animal Producer, Laboratory Animal Breeder, Laboratory Animal Dealer, Laboratory Animal Vendor, Dealer, Commercial Breeder, Laboratory Animal Technician.

Job Description:

Supplies small animals, and in some cases large animals, for laboratory use for both private industry and governmental agency testing, teaching, and research purposes, and for pet shops. Must understand and practice specific mating and breeding systems; provide optimum nutrition, feeding, and watering for animals; must also provide proper housing and caging; must keep accurate identification and records of stock, must know the signs of disease and be cognizant of the steps taken to control diseases of small animals. Must have familiarity with the market needs for laboratory animals. Must be familiar with state, federal, and foreign shipping regulations and with the specific requirements for each species for shipping. Must be familiar with loading and transporting procedures. Can be self-employed, employed by a commercial business, research institution, or employed by a governmental agency or university.

Competencies Identified and Validated

N = 44*

Competencies	Weighted Mean**
1. Know the importance of small laboratory animals to man and the many problems associated with their production.	3.3
a. Recognize the specific problems associated with the species or breed of animals produced.	3.5
b. Like working with small animals.	3.4
c. Have a general knowledge of the use of small animals as a tool of science.	3.2
d. Understand the laws directed to producers and users of small animals for laboratory purposes.	3.0
2. Secure optimum environment for the production of small animals.	2.9
a. Know appropriate sanitation procedures for facilities and equipment.	3.5

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* Responses from 44 Small Animal Suppliers, Managers, and Technicians in 13 states. Survey conducted by The Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Know proper waste disposal procedures.	3.1
c.	Know how to accurately read temperature and moisture recording devices.	3.0
d.	Know optimum service requirements for animal rooms such as lighting, heat, cooling, water, drains, ventilation, and humidity for species produced.	3.0
e.	Know good room design and optimum requirements for each species of small animal.	2.6
f.	Be familiar with noise control techniques.	2.6
g.	Know good building design for small animals.	2.5
3.	Know animal maintenance equipment most appropriate for animal species produced.	3.2
a.	Know best methods of cleaning and sanitizing cages.	3.4
b.	Know proper use of weighing instruments and other equipment required in small animal production.	3.3
c.	Know best feeding equipment for species produced.	3.2
d.	Know best watering devices for species produced.	3.2
e.	Know optimum cage dimensions.	3.2
f.	Know best cage arrangement for servicing.	3.1
g.	Know advantages and disadvantages of different materials used for cages (galvanized iron, steel, zinc, aluminum, wood, plastic, etc.).	2.7
4.	Know optimum diet requirements for each species produced.	3.2
a.	Know when to feed the animals and amount of feed to provide.	3.8
b.	Know best bedding and nesting materials to use.	3.5
c.	Understand most desirable foods needed by each species produced.	3.2
d.	Be familiar with inventory systems to assure that feed is used within a certain time since milling.	3.2
e.	Know advantages and disadvantages of ready-made diets.	2.9
f.	Have general knowledge of proteins, carbohydrates, fats, mineral salts, and vitamins required by each species produced.	2.7
5.	Know optimum mating and breeding systems.	3.2
a.	Know procedures needed for random inbred, hybrid, and selected breeding.	3.5
b.	Know reproductive cycle, gestation and lactation period for species produced.	3.4

	c.	Know most optimum breeding program for species produced.	3.4
	d.	Recognize signs of delivery problems.	3.3
	e.	Know procedures needed to secure monogamous and polygamous stock.	3.1
	f.	Have knowledge of hand mating techniques.	2.8
6.		Know proper handling and sexing procedures of small animals.	3.4
	a.	Know how to properly handle each species produced.	3.8
	b.	Be able to determine sex of each species produced.	3.8
	c.	Know how to identify animals by the use of stains, ear punches, tatooing, etc.	3.1
	d.	Know how to use leg bands, wing bands, collars, chains, neck bands, and ear studs.	2.7
7.		Know diseases, insects, and parasites common to each species produced and their control.	3.4
	a.	Know appropriate methods to sanitize facilities and equipment.	3.7
	b.	Know how to recognize and identify symptoms of various common diseases of species produced.	3.6
	c.	Know best procedures for disposing of dead, sick, and unwanted animals.	3.4
	d.	Know the hygiene and sanitation practices necessary to maintain a specific pathogen free facility.	3.1
	e.	Know methods used in treatment for identified diseases.	3.0
8.		Have knowledge of sanitation procedures.	3.2
	a.	Know the detergents, antiseptics, and sterilization procedures available.	3.3
	b.	Have knowledge of pest control processes and equipment.	3.2
	c.	Know the alternate equipment options available to effectively sanitize rooms, cages, etc.	3.0
9.		Have knowledge of and competence in keeping the various records required for each species produced.	3.3
	a.	Breeding	3.5
	b.	Disease	3.4
	c.	Off-spring	3.4

d.	Weight	3.3
e.	Records necessary in compliance of Federal Regulations	3.3
f.	Feeding and nutrition.	3.2
g.	Marketing	2.7

SWINE FARMER

Other Titles: Farmer, Herdsman, Swine Producer, Swine Breeder.

Job Description:

Breeds and raises swine for sale as meat or for other breeders and swine farmers. Selects and mates boars and sows according to breed or qualities of litter desired. Performs the necessary management practices on newborn pigs. Maintains the records needed for making breeding and selection decisions. Determines quantity and types of feeds as necessary. Performs the necessary approved practices that promote efficient and rapid growth and maintains the health of the swine herd. Inspects and examines swine regularly and makes decisions that prevent problems and corrects existing problems. Sells the breeding stock at auctions or to individuals and negotiates with buyers for sale of swine for meat. May also groom and exhibit swine at livestock shows. May grow crops to provide some or all feed needed for his swine herd.

Competencies Identified and Validated

N = 31*

Competencies	Weighted Means**
1. Perform management practices.	2.7
a. Select animals for breeding.	3.6
b. Purchase and produce swine that will utilize feeds efficiently for profit.	3.4
c. Care for baby pigs at birth.	3.4
d. Identify profitable characteristics of breeds.	3.1
e. Identify estrus.	3.1
f. Keep breeding records and farrowing records.	3.1
g. Care for sow or gilt at parturition.	3.1
h. Handle and care for sows and gilts at breeding.	3.0
i Castrate pigs.	3.0
j. Repair and maintain buildings and equipment.	3.0
k. Identify principal body parts of the hog.	3.0
l. Determine proper space requirements at various levels.	3.0
m. Select animals for market.	2.9
n. Handle and care for boars at breeding.	2.9
o. Clip needle teeth.	2.9

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* Responses from 31 Swine Farmers in 10 states. Survey conducted by Department of Agricultural Education, Iowa State University, Ames, Iowa 50010.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

p.	Administer iron shots.	2.8
q.	Analyze records for selection of breeding stocks.	2.8
r.	Use a pressure sprayer to clean stalls and equipment.	2.8
s.	Ear notch pigs.	2.7
t.	Interpret test station data.	2.7
u.	Develop adequate ventilation systems for buildings.	2.7
v.	Crossbreed for hybrid vigor.	2.7
w.	Clip tails.	2.6
x.	Advise farmers on livestock selection, management, feeding and sanitation.	2.6
y.	Judge a farmer's managerial and production potential.	2.5
z.	Analyze the weaknesses and strengths in a farmers operation and make suggestions that are acceptable to him.	2.5
aa.	Balance litter numbers.	2.4
bb.	Analyze and obtain specific information on any merchandise handled through use of catalogues and specification sheets.	2.3
cc.	Identify the location of primal cuts of meat on live animal.	2.3
dd.	Conduct a hog feeding survey.	2.0
ee.	Probe hogs for back fat.	2.0
ff.	Complete the registration procedures for registering purebred animals.	1.8
gg.	Artificially inseminate sows and gilts.	1.3
2.	Provide sanitary environment and practices for good animal health.	3.1
a.	Identify sick animals.	3.7
b.	Recognize symptoms of swine diseases.	3.6
c.	Identify animals with parasite problems.	3.4
d.	Determine and use management practices that will aid in preventing and controlling animal diseases and parasites.	3.4
e.	Determine proper methods and treatments for parasites.	3.3
f.	Disinfect pens and equipment.	3.3
g.	Treat pigs for scours.	3.3
h.	Dispose of animal wastes without causing environmental problems.	3.2
i.	Disinfect boots and clothing.	3.2
j.	Select and use sanitation products effectively.	3.2
k.	Follow state health requirements.	3.1
l.	Cull and isolate sick animals.	3.1
m.	Vaccinate pigs.	3.0
n.	Operate sprayers and mix spray for external parasite control.	3.0
o.	Mix wormers into feed and feed safely.	3.0

p.	Disinfect navels of pigs.	2.9
q.	Mix liquid wormers.	2.4
r.	Fill and discharge liquid manure wagon.	2.1
3.	Market animals.	2.9
a.	Determine the proper weight and quality of hogs to market.	3.5
b.	Handle hogs to minimize bruises and shrink.	3.5
c.	Select the market which will provide maximum return.	3.4
d.	Estimate weight of hogs.	3.3
e.	Sort and mark hogs for market.	3.3
f.	Evaluate method of marketing (grade and yield, live weight, etc.).	3.2
g.	Interpret market reports from newspaper, radio or TV.	3.1
h.	Estimate the value of meatiness in a carcass.	3.1
i.	Select a hauler for safe and careful handling.	3.1
j.	Identify and justify economics of marketing at various weights.	3.1
k.	Identify and use market trends and cycles in marketing.	3.0
l.	Estimate market grades of hogs.	2.9
m.	Evaluate carcass cut out information.	2.9
n.	Follow proper business procedures in marketing.	2.9
o.	Interpret marketing receipts.	2.8
p.	Gather and use outlook information.	2.7
q.	Obtain and use futures market information.	2.7
r.	Interpret test station data.	2.7
s.	Operate scales and maintain scales.	2.6
t.	Figure shrinkage on lots of hogs marketed.	2.5
u.	Make futures market contacts when profitable.	2.3
v.	Advertise for purebred hogs.	2.0
w.	Interpret and use pedigrees on breeding stock purchases and sales.	2.0
4.	Provide for proper feeding and nutriton.	2.9
a.	Determine the nutrient requirements of different ages, sex, kind, and weight of swine.	3.5
b.	Determine proper feeding and watering space requirements.	3.5
c.	Calculate feed efficiency and costs of gain.	3.5
d.	Identify animals with nutritional deficiencies.	3.4
e.	Keep accurate production and feed records.	3.4
f.	To recognize the quality characteristics of grains and other feeds.	3.3
g.	Determine when to change composition of rations based on poor performance or cost.	3.2
h.	Determine the effects of feed additives.	3.2

i.	Determine mineral requirements needed for a ration.	3.2
j.	Determine the correct feed preparation and feed form for best performance at minimum cost.	3.2
k.	Adjust self-feeders.	3.2
l.	Interpret the information on a feed tag.	3.1
m.	Calculate total ration costs.	3.1
n.	Determine vitamin requirements needed for a ration.	3.1
o.	Operate scales accurately.	3.1
p.	Interpret feed standard tables.	3.0
q.	Identify and make use of the factors affecting the value and palatability of feeds.	3.0
r.	Determine amounts of feed additives to add to a mix and the cost of this additive.	3.0
s.	Interpret feed analysis reports.	3.0
t.	Install and adjust waterers.	3.0
u.	Know the upper and lower limits of certain feeds to include in a ration.	2.9
v.	Formulate a balanced ration by the Pearson square or other methods.	2.9
w.	Calculate nutrient cost per unit.	2.9
x.	Interpret results of feeding experiments.	2.9
y.	Observe and handle feed and equipment safely.	2.9
z.	Find and understand state and federal feed laws.	2.9
aa.	Formulate a least cost or least time ration.	2.8
bb.	Keep inventory reports.	2.8
cc.	Determine substitution rates and substitute feedstuffs in rations.	2.7
dd.	Determine different handling properties of grains and other feeds.	2.7
ee.	Identify storage factors to maintain quality of feeds and prevent contamination of harmful substances.	2.7
ff.	Operate and service grinding and mixing equipment.	2.6
gg.	Clean equipment and area used for preparing feeds.	2.6
hh.	Select proper feed grinding and mixing equipment.	2.5
ii.	Compute proper mixer batch quantities.	2.5
jj.	Operate and service bulk handling equipment.	2.5
kk.	Estimate amounts of materials by volume.	2.5
ll.	Complete forms necessary in mixing and handling formulated feeds.	2.5
mm.	Set metering regulators.	2.4
nn.	Operate the feed grinder and mixer.	2.3
5.	Keep necessary records.	3.0
a.	Use records to improve the swine enterprise.	3.5

b.	Enter figures into records properly.	3.4
c.	Develop short and long term goals.	3.3
d.	Interpret and develop a profit and loss statement.	3.1
e.	Complete an inventory.	3.1
f.	Set up and maintain breeding, farrowing, labor, and feed records.	3.1
g.	Determine a net worth statement.	3.1
h.	Develop short and long term budgets.	3.0
i.	Analyze complete enterprise analysis records.	2.9
j.	Identify data to keep in records.	2.7
k.	Develop an identification system for records.	2.7
l.	Operate calculators.	2.6
m.	Determine freight costs.	2.4
6.	Practice safety procedures.	3.1
a.	Sort and load hogs safely.	3.4
b.	Maintain equipment to prevent injury.	3.3
c.	Operate feed handling equipment properly and keep all protective shields in place.	3.3
d.	Ground all electrical equipment to prevent shock.	3.3
e.	Read and use operator manuals when installing or operating equipment.	3.3
f.	Store disinfectants, wormers, and other medications safely.	3.2
g.	Handle boars during breeding without injury.	3.1
h.	Handle sows with suckling pigs safely.	2.8
i.	Keep a record of accidents and needed cautions.	2.3
7.	Practice good personal and human relations with employees and the general public.	3.2
a.	Make decisions when necessary.	3.7
b.	Be a good listener.	3.7
c.	"Get along" with people.	3.7
d.	Communicate effectively.	3.6
e.	Follow and provide instructions.	3.6
f.	Work irregular hours occasionally.	3.6
g.	Develop self confidence.	3.6
h.	Cooperate with fellow workers.	3.4
i.	Delegate responsibility when necessary.	3.4
j.	Sell yourself and the firm where you are employed.	3.3
k.	Identify factors that make for job success and satifaction.	3.3
l.	Give needed advice diplomatically.	3.2
m.	Direct employees.	3.2
n.	Meet people easily.	3.1
o.	Work under stress.	3.1
p.	Evaluate performance continually.	3.1
q.	Dress appropriately for the job.	3.0

r.	Remember names and faces.	2.9
s.	Judge management and production potentials of people.	2.9
t.	Conduct group meetings or tours.	2.1

CITRUS GROWER

Other Titles: Citrus Farmer, Citrus Grove Worker, Tractor Operator.

Job Description:

An individual seeking employment in Citrus Production should possess skills in nursery operations, grove planting and care, bearing grove care, harvesting, and operation of equipment used in producing this crop. Often employment opportunities are found by individuals who possess skills in one or more of these areas. Workers are usually employed by the owner of the business.

Competencies Identified and Validated

N = 36*

Competencies	Weighted Mean**
1. Operate the nursery.	3.0
a. Selection and cutting of budwood.	3.4
b. Pest and disease control in nursery.	3.3
c. Budding seedling plants.	3.1
d. Regulations (site and disease control).	3.1
e. Care of budling plants.	3.0
f. Weed control (mechanical and chemical).	2.9
g. Seedbed preparation.	2.9
h. Digging nursery trees for sale.	2.7
i. Planting liners for budding.	2.6
2. Planting and care for the grove.	3.1
a. Watering young trees regularly.	3.5
b. Young tree fertilization.	3.3
c. Planting nursery trees in the grove.	3.2
d. Young tree pest control.	3.1
e. Site preparation.	3.0
(1) Land clearing and levelling.	2.9
(2) Staking rows and digging tree holes.	2.9
f. Young tree weed control.	2.9
g. Young tree planting and sprouting.	2.9
3. Care for bearing grove.	2.9
a. Irrigation.	3.4
b. Insect an disease control (spraying).	3.4
c. Fertilization.	3.3

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* Responses from 36 Citrus Growers in 3 states. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

d.	Insect and disease survey and identification.	3.2
e.	Pest management.	3.0
f.	Know EPA regulations.	3.0
g.	Weed control (cultivation and herbicides).	2.9
h.	Pruning.	2.8
	(1) Sprout and sucker removal.	2.5
	(2) Topping.	2.4
	(3) Hedging.	2.3
i.	Cold protection.	2.5
j.	Mowing.	2.3
k.	Ditch maintenance.	2.3
l.	Make grove plats (maps).	2.0
4.	Harvest the crop.	2.3
a.	Harvesting equipment and operation.	3.3
b.	Operate latest equipment.	3.1
c.	Migrant labor regulations.	3.0
d.	Understand workmen's compensation regulations.	2.5
e.	Fruit picking.	2.5
f.	Fruit loading operations.	2.3
g.	Fruit hauling in grove.	2.2
h.	Fruit hauling from grove.	2.1
5.	Know equipment operation skills.	2.9
a.	Know equipment safety precautions.	3.6
b.	Record keeping.	3.5
c.	Sprayer operator.	3.4
d.	Herbicide applicator operator.	3.3
e.	Tractor driver.	3.2
f.	Basic mechanical and servicing skills.	3.2
g.	Truck driver.	2.7
h.	Hedger and topper operator.	2.4
i.	Aerial spraying.	1.9

CORN PRODUCERS

Other Titles: Cash Grain Farmer, Grain Farmer, Farmer, Corn Grower.

Job Description:

Plants, cultivates, and harvests corn for cash sales. Selects and buys type and amount of seed to be grown, taking into consideration local growing conditions and market demands. Operates equipment to plow, disk, harrow, and fertilize ground for planting, and to plant grain. Plans harvesting, considering ripeness and maturity of grain, studies weather conditions, and operates corn-harvesting equipment. Sells corn or stores it for future sales.

Competencies Identified and Validated

N = 38*

Competencies	Weighted Mean**
1. Opportunities.	2.5
a. Recognize advantages and disadvantages of corn production.	2.9
b. Interpret the trends in corn production.	2.8
c. Recognize the importance of corn production in daily living.	2.4
d. Identify the special commercial and industrial uses of corn.	2.3
e. Identify occupational opportunities related to corn production.	2.3
2. Seed selection.	3.0
a. Select the desired seed corn considering maturity, harvest-ability, disease resistance, lodging resistance, insect resistance, and yield level.	3.7
b. Interpret planting charts on the seed corn bag to establish proper planter plate selection.	3.6
c. Read and evaluate the tag on a bag of seed corn.	3.4
d. Calculate the number of bushels (units) of seed corn needed to plant a fixed number of acres at various population levels.	3.3

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* Responses from 38 Corn Producers representing 5 states in the principle corn producing area of the United States. Survey conducted by the Department of Agricultural Education, University of Nebraska, Lincoln, Nebraska 68583.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	e.	Determine the length of maturity of various hybrids sold by an individual seed corn company.	3.2
	f.	Identify the materials used to treat seed corn and explain the purpose of treatment.	2.7
	g.	Identify the parts of corn kernels and discuss functions of each part.	2.2
	h.	Determine where on the corn ear the different size seed were obtained: small rounds, flats, large rounds, and culls.	2.0
3.	Seedbed preparation.		3.0
	a.	Prepare desirable seedbed for corn.	3.5
	b.	Identify the characteristics of a good seedbed.	3.1
	c.	Recognize the opportunities of combining pest control and fertilizer application with seedbed preparation.	2.9
	d.	Compare the relative advantages of minimum and conventional tillage systems.	2.9
	e.	Recognize the tillage system used in seedbed preparation.	2.8
4.	Planting methods and practices.		2.8
	a.	Calculate the actual seeding rate per acre based on desired final plant population and estimate mortality rate.	3.4
	b.	Describe the effect of planting date, row spacing and plant population on yield.	3.1
	c.	Explain the opportunities of combining pest control and fertilizer application with planting operations.	2.9
	d.	Plant corn.	2.9
	e.	Identify types of planting equipment.	2.8
	f.	Compare drill, hill drop and check planting.	2.3
	g.	Calendarize the home farm corn acreage.	2.3
5.	Fertilizer rates and application.		3.2
	a.	Determine fertilization rates required for maximum yield or maximum return per fertilizer dollar.	3.5
	b.	Recognize the effect of nutrient levels and fertilizer placement on yield and quality of corn.	3.4
	c.	Identify nutrient deficiency symptoms in corn.	3.3
	d.	Develop a farm fertilization program for corn.	3.2
	e.	Apply fertilizer.	3.2
	f.	Describe the nutrient requirements for corn.	3.0
	g.	Describe the different methods of fertilizer application for corn.	2.7

6.	Pests - weeds, insects, and disease.		3.1
	a.	Control weeds, insects, and diseases of corn on home enterprise.	3.5
	b.	Identify the major corn pests on plants and in grain.	3.1
	c.	Select cultural and chemical control practices for corn pests.	3.1
	d.	Identify pest damage on corn.	2.9
	e.	Estimate the economic loss due to reduced yield, increased harvesting loss, or reduced quality that can be attributed to corn pests.	2.9
7.	Harvesting and storing.		3.2
	a.	Determine harvesting losses of corn and make the necessary machine adjustments.	3.6
	b.	Properly harvest corn.	3.6
	c.	Determine the stages of maturity for corn and the proper time of harvesting for silage and for grains.	3.3
	d.	Identify and select the storage facilities and equipment needed for various methods of corn harvest (include dryer).	3.3
	e.	Select a harvesting and storage system for corn based on efficiency and economy.	3.3
	f.	Determine the moisture content of harvested corn.	3.2
	g.	Calculate the volume of a structure needed to store a certain number of bushels of corn.	2.8
	h.	Treat stored corn for pest control.	2.8
8.	Marketing.		2.7
	a.	Market corn to the best advantage.	3.5
	b.	Locate market outlets for corn.	3.1
	c.	Determine market grade requirements for corn.	2.8
	d.	Discount the price of corn for test weight, moisture and damage.	2.7
	e.	Collect and interpret corn market information.	2.7
	f.	Select the month when it would be most profitable to market corn.	2.7
	g.	Calculate corn shrinkage.	2.6
	h.	Explain how and where local corn prices are set.	2.5
	i.	Describe the supply and demand for corn.	2.5
	j.	Identify several sources of corn market information.	2.4

9.	Production economics.	3.0
a.	Keep and analyze production records for corn.	3.2
b.	Budget the annual cost and returns in corn production.	3.1
c.	Set realistic goals for a corn production enterprise.	3.0
d.	Analyze the economic features of various cultivation practices used in corn production.	2.9
e.	Calculate various efficiency factors in corn production.	2.8

COTTON FARMER

Other Titles: Farmer, Crop Farmer (Southern United States), General Farmer (Southern United States).

Job Description:

Evaluates mechanical, cultural, and chemical weed control and plans and applies a weed control program. Determines macro and micro nutrient requirements, compares yield results from using different nutrient sources, plans a fertility program, and applies fertilizer. Determines degree of insect threat, compares cultural and chemical insect control, and plans and applies insect control program. Selects a harvesting and storage method, determines time to harvest, and operates harvest and storage equipment. Calculates costs and returns from defoliation, selects defoliation material, determines time to defoliate, and applies defoliant. Calculates profits and analyzes future production. Selects the land for planting, determines the time to plow, and plows the land. Recognizes disease symptoms, evaluates chemical and cultural disease control, and plans and applies a disease control program. Recognizes factors of variety selection, evaluates variety characteristics, and selects and secures seed. Evaluates ginning efficiency and selects a gin. Plans and applies an irrigation program. Evaluates the character of cotton and recognizes the value of lint cotton.

Competencies Identified and Validated

N = 43*

Competencies			Weighted Mean**
1.	Evaluate growing cotton.		2.6
	a.	Evaluate opportunities in cotton production.	2.9
	b.	Understand government policies that affect cotton production.	2.7
	c.	Know United States and world demand for cotton.	2.4
	d.	Discuss the history of cotton.	2.2
2.	Select and prepare land for cotton production.		3.2
	a.	Plow the land.	3.4
	b.	Select the land to use.	3.1
	c.	Determine the time to plow land.	3.0

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* Responses from 43 Cotton Producers in 9 states. Survey conducted by Department of Agricultural Education, Texas A & M University, College Station, Texas 77843.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.		Select and use fertilizers and soil amendments.	3.2
	a.	Apply fertilizers.	3.3
	b.	Plan a fertility program using combinations of nutrient sources to be applied at designated times in specified amounts.	3.2
	c.	Determine cotton macro and micro nutrient requirements.	3.2
	d.	Compare yield results from using different sources of nutrients and soil amendments.	3.0
4.		Select the variety and obtain the seed.	2.5
	a.	Evaluate characteristics of varieties.	3.1
	b.	Select and secure seed.	3.0
	c.	Recognize factors of variety selection.	2.5
5.		Plant seed.	3.3
	a.	Adjust planter.	3.5
	b.	Prepare seedbed for planting.	3.4
	c.	Determine the time to plant on different type soils.	3.1
6.		Control weeds.	3.3
	a.	Apply a weed control program.	3.5
	b.	Plan a weed control program.	3.4
	c.	Evaluate chemical weed control.	3.4
	d.	Evaluate mechanical and cultural weed control.	3.2
	e.	Recognize that all weeds are harmful to cotton.	3.1
7.		Control insects.	3.2
	a.	Determine the degree of insect threat.	3.4
	b.	Evaluate chemicals for insect control.	3.3
	c.	Apply insect control program.	3.3
	d.	Plan an insect control program.	3.2
	e.	Evaluate cultural insect control methods.	3.0
8.		Control diseases.	2.9
	a.	Apply a disease control program.	3.2
	b.	Evaluate chemical disease control.	2.9
	c.	Evaluate cultural disease control methods.	2.9
	d.	Recognize disease symptoms.	2.9
	e.	Plan a disease control program.	2.8
9.		Irrigate.	2.8
	a.	Apply irrigation.	2.9
	b.	Plan an irrigation program.	2.6
10.		Defoliate.	3.2
	a.	Apply defoliants.	3.3
	b.	Determine when to defoliate.	3.3
	c.	Select materials for defoliation.	3.1

d.	Calculate the cost and returns from defoliation.	3.0
11.	Harvest cotton.	3.3
a.	Operate harvest and storage equipment.	3.6
b.	Determine time to harvest.	3.2
c.	Select a harvesting and storage method.	3.0
12.	Select a gin.	2.8
a.	Evaluate efficiency of available ginning facilities.	2.8
b.	Select a gin based on net returns from ginning.	2.8
13.	Recognize cotton classes.	2.7
a.	Recognize the value of lint cotton.	2.7
b.	Evaluate the character of cotton.	2.7
14.	Market the cotton.	2.9
a.	Evaluate market news information.	3.0
b.	Evaluate the government program.	2.9
c.	Sell cotton.	2.8
15.	Analyze production.	3.2
a.	Calculate profits from production.	3.3
b.	Analyze future production.	3.1

FORAGE PRODUCER

Other Titles: Farmers, Forage Crop Grower.

Job Description:

Plants, cultivates, and harvests forages for cash sales and/or feeding to livestock. Selects and buys type and amount of seed to be grown, taking into consideration local growing conditions and market demands. Operates equipment to plow, disk, harrow, and fertilize ground for planting. Plans harvesting, considering ripeness and maturity of plants and weather conditions, and operates forage harvesting equipment. Sells crop or stores it for future sales.

Competencies Identified and Validated

N = 31*

Competencies		Weighted Mean**
1.	Opportunities.	2.6
a.	Select the correct forage for a specific purpose on a given farm.	3.3
b.	Estimate the economic value of an acre of forage as hay, silage, or pasture.	3.0
c.	Explain the comparative advantages of forages in a farming program.	2.8
d.	Categorize forages as annuals, biennials, or perennials and as either grasses or legumes.	2.6
e.	Identify the specialized uses of various forage crops such as birdsfoot trefoil, sweetclover, crown vetch, reed canary grass, and sudangrass.	2.5
f.	Interpret the trends of forage production in the United States, in your home state, and your county.	2.1
g.	Determine the major forage crops grown in the United States and in your home state.	2.1
h.	Identify occupational opportunities that are related to forage production.	2.1
2.	Forage identification and seed selection.	2.8
a.	Select high quality seed.	3.4
b.	Select adapted varieties of forage crops.	3.2
c.	Identify grass and legume seeds of forage crops grown locally.	2.8

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* Responses from 31 Forage Crop Producers. Survey conducted by the Department of Agricultural Education, University of Nebraska, Lincoln, Nebraska 68583.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	d.	Identify grass and legume seedlings.	2.7
	e.	Explain the purpose of vernalization and sacrification in forage crop production.	2.0
3.	Tillage and planting.		3.2
	a.	Obtain a good stand of a new seeding.	3.6
	b.	Determine seeding rates and depth of planting.	3.4
	c.	Evaluate the old stand of forage and determine the practices and procedure needed to improve the stand.	3.2
	d.	Describe the tilling practices required for the establishment and renovation of temporary, rotation, and permanent pastures.	3.1
	e.	Identify equipment and methods used in establishing forage stands.	3.1
	f.	Analyze the comparative costs of different production methods of producing forages.	3.1
	g.	Compare broadcast seeding to drilling.	2.5
4.	Fertilizer and lime.		3.1
	a.	Calibrate fertilizing equipment.	3.4
	b.	Make fertilizer recommendations for forages from a soil test report.	3.3
	c.	Recognize major plant food deficiency symptoms in growing forages.	3.2
	d.	Outline the steps in forage improvement, fertilization, and liming.	3.2
	e.	Develop a fertilization program for small grains and subsequent forage crops.	3.1
	f.	Determine the optimum pH range for forage production.	2.9
	g.	Recognize the different methods for applying fertilizer on forages.	2.8
5.	Pests - weeds, insects, diseases.		3.1
	a.	Summarize the precautions which should be followed when using pesticides.	3.4
	b.	Calibrate pesticide applicators.	3.3
	c.	Choose proper pesticides to be used on forages.	3.2
	d.	Recognize the residue limitations or restrictions on forage pesticides.	3.2
	e.	Distinguish between insect, disease and weed damage to forage plants.	3.1
	f.	Identify a potential damaging insect, weed or disease problem.	2.9
	g.	Estimate the economic loss due to reduced yield, increased harvesting loss, or reduced quality that can be attributed to forage pests.	2.9
	h.	Explain the importance of crop rotation in the control of forage pests.	2.9

	i.	Describe the practices being used in the community to control forage pests and evaluate their effectiveness.	2.7
6.	Harvesting, storage, and marketing.		2.8
	a.	Recognize possible bloat problems and recommend preventative measures.	3.3
	b.	Determine the optimum moisture content for beginning machine harvest to insure proper storage and preservation.	3.3
	c.	Adjust machines used in harvesting forages and forage seed.	3.3
	d.	Recognize the effects of grazing too early, overgrazing, or clipping on forage fields.	3.2
	e.	Recognize the proper stage of maturity to harvest for highest quality forage.	3.2
	f.	Use machinery efficiently to minimize harvest time.	3.2
	g.	Identify safety hazards present in harvesting, transporting and storing forages.	3.1
	h.	Determine the value of forages in a crop rotation.	3.0
	i.	Evaluate the quality of forages being fed.	3.0
	j.	Determine the relative nutrient value of silage, green chop, and haylage.	2.9
	k.	Evaluate the alternative costs of different forage harvesting and storing methods.	2.9
	l.	Compute the carrying capacity of pastures.	2.9
	m.	Explain the need for root reserves and/or leaf area for proper regrowth.	2.8
	n.	Determine efficiency gained by rotational grazing patterns within a field.	2.8
	o.	Recognize common forage problems: winter-kill, disease, herbicide carryover, etc.	2.8
	p.	Explain the criteria for quality forages: odor, color, leafiness, and freedom from foreign material.	2.7
	q.	Use weather information to reduce risk of rain damage in forage harvesting.	2.6
	r.	Select the month when it would be most profitable to market forages.	2.6
	s.	Determine the relative advantages of conditioning forages.	2.6
	t.	Condition hay.	2.6
	u.	Explain the comparative advantages cf various forage storage structures.	2.6
	v.	Compute tonnage of forage in various shaped storage structures.	2.5
	w.	Identify and explain the operating principles of forage handling and storage equipment.	2.5
	x.	Describe the problems involved in marketing forages.	2.4

y.	Describe the commercial products used for storage and their methods of application.	2.4
z.	Determine the market grades of hay.	2.4
aa.	Explain how local prices for forages are established in the local community.	2.3
7.	Production economics.	2.6
a.	Determine the value of forage crops marketed through livestock.	2.9
b.	Calculate various efficiency factors in forage production.	2.8
c.	Determine realistic goals in forage production.	2.7
d.	Budget the costs and returns on a forage crop using sample records.	2.6
e.	Justify the production of forages on Class I and Class II land.	2.5
f.	Develop equitable rental or leasing arrangements for pasture and forage cropland.	2.5
g.	Determine government cost-sharing on pasture improvement projects.	2.5
h.	Determine results obtained from the modification or adoption of new practices and compare these results with those obtained from experimental studies and local test plots.	2.4

APICULTURIST

Other Titles: Beekeeper, Honey Producer, Honey Farmer.

Job Description:

The occupation of Apiculturist involves a wide range of activities in the management and operation of bee colonies. The size of the operation varies considerably. The duties may include preparing hives, providing suitable flowering plants, maintaining bees during winter, operating equipment to handle bees, feeding bees, controlling diseases and pests, harvesting honey, processing, and marketing honey and beeswax.

Competencies Identified and Validated

N = 41*

Competencies		Weighted Mean**
1.	Establish apiary facilities.	3.0
a.	Select site for hives.	3.5
b.	Assemble bought hives.	2.7
c.	Construct hives.	2.5
d.	Plan arrangement of hives.	2.4
2.	Provide suitable plants.	2.8
a.	Study availability of plants producing pollen and nectar.	3.5
b.	Identify desirable plants.	3.1
c.	Select desirable plants.	2.9
d.	Establish desirable plants.	1.7
3.	Provide seasonal management.	3.3
a.	Provide food supply in winter.	3.4
b.	Maintain strength of hives in fall.	3.3
c.	Prevent swarming in spring.	3.3
d.	Encourage spring honey production.	3.2
4.	Establish a bee farm.	3.0
a.	Obtain necessary equipment and facilities.	3.5
b.	Secure needed financing.	3.5
c.	Budget financial resources.	3.4
d.	Select honey bee stocks.	3.0
e.	Determine availability of market for honey, bees wax, and bees.	2.9

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* Responses from 41 Apiculturists in six states. Survey conducted by Department of Agricultural and Extension Education, Mississippi State University, Mississippi State, Mississippi 39762.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

f.	Employ needed labor.	2.8
g.	Submit required government reports.	2.5
h.	Determine if persons are allergic to bee stings.	2.5
5.	Understand bee biology and behavior.	2.5
a.	Understand effect of weather on bee behavior.	3.1
b.	Understand the bee's social organization.	3.0
c.	Identify different species or types of bees.	2.2
d.	Identify external parts of bee.	2.0
6.	Feed bees.	2.8
a.	Understand importance of artificial feed.	2.9
b.	Select feed to use.	2.9
c.	Determine amount of feed.	2.8
d.	Select method of feeding.	2.7
7.	Operate equipment.	3.0
a.	Use extractor and other honey processing equipment.	3.3
b.	Operate smoker.	3.3
c.	Use hive tools.	3.2
d.	Use bee veils.	3.2
e.	Use bee gloves.	2.1
8.	Control disease, parasites, and other pests.	3.5
a.	Determine symptoms.	3.8
b.	Diagnose problem.	3.7
c.	Select treatment or prevention program.	3.6
d.	Prevent death or injury due to use of pesticide in vicinity.	3.3
e.	Calculate chemicals or drugs.	3.3
f.	Administer chemicals or drugs.	3.1
9.	Control pests.	3.1
a.	Control waxworm.	3.3
b.	Control mice.	2.9
10.	Manage brood.	3.0
a.	Replace inferior queen.	3.6
b.	Recognize inferior queen.	3.5
c.	Improve stocker bees.	2.8
d.	Limit drone activity.	2.0
11.	Harvest honey.	3.1
a.	Determine amount of honey to leave for bees.	3.5
b.	Select time to remove honey.	3.0
c.	Remove frames of honey.	2.7
12.	Process honey.	2.8
a.	Extract honey.	3.4
b.	Uncap honey.	3.1

c.	Strain honey.	2.8
d.	Package honey.	2.7
e.	Check honey flavor.	2.6
f.	Determine honey color.	2.4
g.	Heat honey.	2.3
13.	Market honey and bees wax.	2.2
a.	Secure wholesale or bulk markets.	2.8
b.	Grade honey.	2.6
c.	Establish selling prices.	2.3
d.	Establish retail outlet.	2.1
e.	Haul honey.	2.0
f.	Prepare advertisement for honey.	1.9
g.	Operate a roadside honey stand or store.	1.4

GRAIN SORGHUM

Other Titles: Farmers, Grain Sorghum Producer, Cash Grain Farmer, Grain Sorghum Grower, Grower, Milo Producer, Milo Grower, Milo Farmer, Feed Grain Producer, Feed Grain Farmer.

Job Description:

Determines capital needs and resources for producing crops, prepares land for planting, selects proven varieties for local conditions, plants crop, interprets soil test and fertilizer recommendations, fertilizes crop at appropriate time; plans tillage practices based on need, moisture conditions, and local practices; determines quality and availability of irrigation water, plan irrigation program according to climate, cost and return, and soil structure, irrigates according to crop needs and soil moisture conditions; determines need for herbicide, pesticide, and fungicide applications; applies agricultural chemicals, and determines need and practices minor machinery repair; operates farm equipment for plowing, planting, harvesting, storage and marketing; plans harvesting and storage of grain according to weather conditions, growing season maturity, use (high moisture - livestock feed, etc.) storage facilities; determines sources and demand of cash markets, contracting of crop, and future's markets.

Competencies Identified and Validated

N = 52*

Competencies	Weighted Mean**
1. Developing plans to grow milo.	3.0
a. Secure adequate credit to finance milo production enterprise.	3.6
b. Determine profit potential in establishing the milo production enterprise.	3.4
c. Increase or improve knowledge of milo production through trade publications, journals, technical meetings, grower associations, agriculture publications, market reports, etc.	3.1
d. Understand supply and demand and marketing functions of milo production.	3.0
e. Realize personal weaknesses and works to overcome them through study and consultation with specialist.	2.9

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* Responses from 52 Growers, Educators and Agribusiness People in 4 states. Study conducted by Agricultural Education Department, Oklahoma State University, Stillwater, Oklahoma 74074.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

f.	Determine land class capability and soil type for irrigated milo production.	2.8
g.	Analyze personal characteristics, background (experience) and formal education in milo production.	2.5
2.	Production economics.	3.0
a.	Calculate and use efficiency factors to determine the least cost and maximum return to enterprise.	3.2
b.	Analyze results obtained from the modification or adoption of new practices and compare results with those obtained from experimental studies and local demonstration plots.	3.1
c.	Determine a cash flow planning budget for milo production.	3.1
d.	File milo production records for post production analysis.	3.1
e.	Determine cost and return for dryland vs. irrigated milo production.	2.7
3.	Soil analysis and fertilizer application.	3.2
a.	Calculate the rate of fertilization application to receive maximum return per fertilizer input (dollar) invested.	3.6
b.	Recognize the importance of timing and proper fertilizer placement for milo production.	3.5
c.	Recognize the various methods of fertilizer application and plan fertilization program for milo.	3.2
d.	Prepare a soil sample for testing and interpret soil test results.	3.1
e.	Determine soil moisture conditions.	3.0
f.	Visually identify approximate plant nutrient deficiency symptoms.	2.9
g.	Interpret a soil pH test and the optimum range for milo production.	2.8
4.	Irrigation.	2.6
a.	Determine the minimum requirements that pertain to the design, installation, performance of sprinkler, and furrow irrigation equipment and availability of fuel.	2.8
b.	Determine water requirements of milo and be able to calculate and use conversion factors and water measurement.	2.7
c.	Be familiar with State and local stream rights and ground water policy.	2.6
d.	Consider water quality, interpret water analysis reports, and use water classification tables.	2.4

5.	Agricultural chemicals.	3.2
a.	Pesticides.	3.5
(1)	Identify insect pests that are of major nuisance to milo production in your locality and insect damage to milo.	3.6
(2)	Identify current pest control practices and evaluate their effectiveness (cost, form, rates, method of application, and danger).	3.4
b.	Herbicides.	3.4
(1)	Identify weeds that are of major nuisance for milo producers in your local community and plan effective herbicide or cultural control program.	3.5
(2)	Identify the current weed control practices and evaluate their effectiveness (pre-emergence, post-emergence, rates, methods, and dangers).	3.5
(3)	Calibrate herbicide applicators.	3.4
c.	Demonstrate valid safety precautions in agriculture chemical application and the use of safety equipment.	3.3
d.	Identify warning symptoms that are dangerous to personal health and demonstrate the procedures and use of proper chemical antidotes.	3.2
e.	Be a licensed pesticide applicator (for individual owner, operator application) and be familiar with EPA Chemical Regulations.	2.9
f.	Fungicides.	2.8
(1)	Distinguish between nutritional deficiencies, fertilizer damage, chemical damage, insect damage, insect borne diseases and fungi-borne diseases and viruses.	3.1
(2)	Identify plant diseases that are of major concern to milo production in your locality and disease damage to the milo crop.	2.8
(3)	Identify current plant disease control practices and evaluate their effectiveness for your local area. (Cost, form, rate, method of application, effectiveness, and dangers) and compare the advantages and disadvantages of cultural control vs. chemical control.	2.8

(4) Plan effective plant disease control program and be able to calibrate fungicide applicators.	2.7
6. Variety selection.	3.3
a. Select variety or strain best suited to local conditions. (Soil, climate, yield, insect, and disease tolerance, etc.).	3.6
b. Select variety or strains that are adaptable to modern harvest and storage methods.	3.3
c. Select variety or strains that respond efficiently to irrigation and fertilizer application.	3.2
d. Evaluate certified seed tag analysis.	2.9
e. Select variety or strains that are high in feeding value (palatable, high quality protein, TDN value, etc.).	2.7
7. Tillage practices.	3.3
a. Planting methods and practices.	3.5
(1) Calibrate or set planting equipment to get desired planting rate (number of plants per foot).	3.7
(2) Evaluate the most modern practices pertaining to number of plants per foot (linear foot) depth of planting (air, lister furrow, grain drill, etc.).	3.4
b. Seedbed preparation.	3.4
(1) Identify the characteristics of a good seedbed.	3.5
(2) Operate "modern" farm equipment to prepare production location for long term utilization (grading, irrigation, drainage, terracing, and seedbed preparation, etc.).	3.2
c. Cultivation practices.	3.0
(1) Identify and compare advantages of minimum tillage vs. conventional tillage.	3.0
(2) Identify the proper equipment needed for conventional tillage.	3.0
8. Equipment repair.	2.7
a. Cooling systems.	2.9
(1) Repair, replace, and/or service radiators, water hoses, water pumps, air baffles, coolants, antifreeze, thermostats, etc.	2.9

b.	Electrical system.	2.8
(1)	Diagnose, repair, and/or service ignition, generator, starter, and light systems.	2.8
c.	Fuel systems.	2.7
(1)	Repair and service fuel systems (fuel pumps, carburetor, injection pumps, nozzles, fuel filters, etc.).	2.7
d.	Power trains and hydraulics.	2.6
(1)	Have understanding of basic hydraulics (pumps, motors, controls, oil, and filters).	2.8
(2)	Repair and service clutch systems, differentials, power take-off, hydraulic lift, brake system, steering system, etc.	2.5
e.	Welding.	2.6
(1)	Be able to arc and acetylene weld bronze, mild steel, and cast iron.	2.6
9.	Harvesting and storing methods.	3.0
a.	Measure harvesting losses and determine necessary machine adjustments.	3.4
b.	Determine grain maturity, moisture content and grade of milo.	3.3
c.	Select harvesting equipment, drying methods, and storage facilities based on efficiency.	3.0
d.	Determine drying methods and storage of dry milo grain.	2.8
e.	Determine storage method and facilities for high moisture milo grain.	2.6
10.	Marketing.	3.2
a.	Identify and interpret grain market information (cash, contracts, and futures).	3.3
b.	Select the marketing period most profitable for milo marketing.	3.3
c.	Identify milo marketing outlets (co-ops, grain elevators, export or feedlots).	3.2
d.	Determine grade or quality requirements and discount the price of milo for test weight, moisture, and damage.	3.1

MUSHROOM GROWER

Other Titles: Mushroom Producer, Mushroom Farmer, Mushroom Worker, Mushroom Cultural Expert, Mushroom Supervisor, Mushroom Farm Manager, Mushroom Technician, Mushroom Coordinator, Mushroom Production Supervisor.

Job Description:

Secures optimum environment of temperature and moisture for growing mushrooms; manages wharf area for preparing compost; provides compost; fills beds in house with compost; pasteurizes compost; secures spawn and spawns beds; cases beds after spawn run; cares for the growing crop; picks the crop; markets crop; cleans out and cleans up house in preparation for growing next crop; helps keep financial records of the business. Often supervises other workers. Keeps up-to-date by reading industry publications and attending industrial seminars and short courses. Is employed by the owner of the business.

Competencies Identified and Validated

N = 51*

Competencies		Weighted Mean**
1.	Secure optimum environment for growing mushrooms.	3.7
a.	Know optimum temperature and moisture requirements for mushroom production at all stages of the crop.	3.9
b.	Control ventilation and moisture equipment to secure optimum conditions for growing mushrooms.	3.7
c.	Understand the use and capacity of ventilation equipment.	3.6
d.	Take emergency action due to equipment or power failures to prevent loss of the crop.	3.4
e.	Have knowledge of air flows.#	
f.	Improvise if needed.#	
2.	Provide good composting wharf conditions.	2.8
a.	Control compost drainage runoff.	2.9
b.	Keep wharf area free from weeds and the collection of rubbish.	2.8
c.	Prevent and control rats and mice in wharf area.	2.7

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* Responses from 51 Mushroom Growers in 14 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

# Not included on questionnaire but recommended by some experts surveyed.

3.		Provide compost.	3.6
	a.	Recognize properly prepared compost for filling beds and trays.	3.8
	b.	Turn the compost as needed, for aeration.	3.7
	c.	Understand reasons for composting.	3.7
	d.	Recognize the need for different turning cycles for various types of composting materials and weather conditions.	3.6
	e.	Know and provide the proper moisture requirements in the composting process.	3.6
	f.	Provide optimum amount of nitrogen in compost by adding nitrogen supplement if needed.	3.6
	g.	Recognize the quality requirements of basic ingredients used in composting.	3.5
	h.	Prepare compost from horse manure or synthetic materials, gypsum, and other additives.	3.5
	i.	Recognize anaerobic bacterial action in both the pile and the pit water.	3.5
4.		Fill the beds or trays with compost.	3.5
	a.	Recognize the need for more or less moisture in the compost at filling for long or short compost and take corrective action.	3.8
	b.	Clean and disinfect house for filling.	3.5
	c.	Fill beds or trays level full and of uniform density with compost.	3.2
5.		Provide proper curing of compost by cookout.	3.7
	a.	Know the purpose of the cookout procedure.	3.8
	b.	Be able to determine the absence of free ammonia at the end of cookout.	3.8
	c.	Know when there is adequate oxygen.	3.7
	d.	Recognize the need for a thorough air kill.	3.7
	e.	Determine the best cookout procedure for a particular house and follow that procedure.	3.5
6.		Prepare for spawning the compost beds.	3.2
	a.	Know that pre-spawn preparation is the most critical time during the entire cycle, that recontamination must be prevented.	3.8
	b.	Test for the presence of free ammonia.	3.5
	c.	Have the knowledge and skill to properly use the insect fogger.	2.9
	d.	Paint wood surfaces with insecticide to aid in fly control and install electric fly traps.	2.5

e.	Prepare a fly control program for entire growth period. #	
7.	Spawn the compost beds.	3.2
a.	Understand and practice good sanitation procedures during the spawning process.	3.8
b.	Know and provide optimum bed moisture requirements during spawning and the spawn run.	3.7
c.	Provide optimum temperature continuously during spawn run.	3.5
d.	Apply appropriate insecticides during spawn run.	3.5
e.	Know the best method of spawning for your facilities.	3.3
f.	Select the spawn which will produce the best crop yields for your market.	3.2
g.	Determine when spawn run is complete.	3.1
h.	Prepare the optimum bed surface shape for the facilities.	3.0
i.	Provide optimum spawning rate for the mushroom production operation considering price of spawn.	2.7
j.	Provide plastic cover for spawned beds and trays.	2.2
8.	Case the spawned beds or trays.	3.5
a.	Water casing layer using best techniques, to provide optimum moisture content.	3.8
b.	Be alert to potential disease and fly problems.	3.7
c.	Pasteurize casing materials.	3.7
d.	Understand the reasons for casing.	3.6
e.	Know optimum temperature and CO_2 requirements after casing.	3.6
f.	Apply casing materials using optimum amounts.	3.5
g.	Follow the most desirable procedures in preparing materials for casing.	3.4
h.	Know the casing materials that may be used and the advantages and disadvantages of each.	3.3
i.	Store pasteurized casing materials following sanitary practices.	3.3
9.	Grow the mushroom crop.	3.6
a.	Provide optimum temperature, humidity, and fresh air to the growing crop.	3.7
b.	Provide maximum cleanliness throughout house during crop growing period including the removal of dead mushroom tissue, diseased or blemished mushrooms.	3.5

# Not included on questionnaire but recommended by some experts surveyed.

	c.	Provide maximum disease and fly control to the growing crop by the use of appropriate insecticides, fungicides, and bacteriacides.	3.6
	d.	Know when to water, how much, and where; understand the meaning of some beds drying, others not. #	
10.		Harvest and market the crop.	2.9
	a.	Pick or harvest mushroom crop at optimum stage of maturity desired by the market.	3.4
	b.	In picking, select "tight" mushrooms and avoid damage by handling.	3.0
	c.	Ship the crop as soon as possible after picking or store the crop until marketed in a cool environment.	2.8
	d.	Recognize when it is uneconomical to continue cropping.	2.7
	e.	Know the most convenient and profitable marketing outlets for the crop.	2.5
11.		Clean-out and clean-up the house.	3.3
	a.	Eradicate all diseases and insects within the house before clean-out.	3.4
	b.	Follow the most efficient practices (for the facilities) in clean-out and disposal.	3.2
	c.	Clean-up and repair the empty house for next filling.	3.2
12.		Supervise workers.	3.1
	a.	Develop harmonious relationships with workers.	3.2
	b.	Train workers for various jobs.	3.1
	c.	Suggest to workers improvements of methods of accomplishing work.	3.1
	d.	Observe employee compliance to safety regulations.	3.1
	e.	Assist in planning work schedules of employees.	3.0
	f.	Judge prospective employee qualifications.	2.9
	g.	Is competent in explaining to subordinates the meaning of environment and relationship to mushrooms. #	

Not included on questionnaire but recommended by some experts surveyed.

NUT PRODUCER

Job Description:

Nut Producers are persons who establish and/or manage a grove of nut producing trees. They apply the cultural practices necessary to produce quality nuts. They also are responsible for harvesting, storing, and marketing the nuts.

Competencies Identified and Validated

N = 31*

Competencies		Weighted Mean**
1.	Provide financing.	3.3
2.	Establish grove.	3.2
	a. Determine varieties suitable for area.	3.6
	b. Select site for grove.	3.4
	c. Determine spacing for trees.	3.4
	d. Prune and train young trees.	3.4
	e. Water young trees during dry periods.	3.4
	f. Procure young trees.	3.2
	g. Transplant trees.	3.2
	h. Bud or graft seedlings.	2.8
3.	Maintain soil fertility.	3.7
	a. Apply needed nutrients.	3.6
	b. Recognize deficiency symptoms.	3.4
	c. Take soil samples.	3.3
	d. Manage soil to prevent erosion.	3.2
	e. Collect leaf sample for analysis.	3.1
4.	Maintain trees and grounds area.	3.5
	a. Control weeds by mowing and/or using chemicals.	3.4
	b. Prune trees as needed.	3.2
	c. Remove limbs from area.	3.0
5.	Control pests.	3.7
	a. Apply needed control measures.	3.8
	b. Recognize disease symptoms.	3.7
	c. Apply needed control measures.	3.7
	d. Practice safety in using chemicals.	3.6
	e. Recognize insect pests.	3.6
	f. Control predators.	3.3

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* Responses from 31 Nut Producers in 7 states. Survey conducted by Department of Agricultural Education, University of Georgia, Athens, Georgia 30602.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

6.	Harvest nuts.	3.7
	a. Determine best method of harvesting.	3.4
	b. Determine maturity of nuts.	3.1
7.	Clean nuts.	3.0
8.	Store nuts.	2.8
9.	Market nuts.	3.6
	a. Locate suitable market for nuts.	3.6
	b. Transport nuts to market.	2.7
10.	Keep records.	3.5
11.	Operate equipment and machinery.	3.5
	a. Adjust equipment for maximum efficiency.	3.6
	b. Recognize malfunction in equipment.	3.5
	c. Service machinery and equipment according to operator's manual.	3.3
	d. Use safety standards relating to the operation of a particular piece of equipment.	3.2
	e. Prepare equipment and machinery for storage.	3.2
12.	Participate in local, state and national organizations and meetings relevant to nut production.	3.3
13.	Adjust production techniques based on latest research findings.	3.3

PEANUTS

Other Titles: Farmer, Peanut Grower, Grower, Peanut Producer, Commercial Peanut Producer, Peanut Farmer.

Job Description:

Has knowledge of Government Allotment Program for his farm, determines capital needs for producing peanuts; prepares land for planting, selects proven varieties for local conditions, plants crop, interprets soil test and fertilizer recommendations, fertilizes crop at appropriate time; determines the quality and availability of irrigation water, irrigates according to climatic and soil moisture conditions; determines need for herbicide, pesticide and fungicide applications, applies Ag. Chemicals; determines need and practices minor machinery repairs, plans harvesting of crop based on weather conditions, growing season and maturity of crop, plans for storage facilities; use of dryers and government storage program, determines market conditions (Government support and loan program and cash market demand).

Competencies Identified and Validated

N = 65*

Competencies	Weighted Mean**
1. Develop plans to grow peanuts.	3.2
a. Determine profit potential in establishing the peanut enterprise.	3.7
b. Realize personal weaknesses and work to overcome them through study and consultation with a specialist.	3.4
c. Increase or improve knowledge of peanut production through trade publications, journals, technical meetings, grower associations, agriculture publications, and market reports.	3.4
d. Understand supply and demand marketing functions, government allotments, and price support system.	3.2
e. Determine appropriate land class and soil type for irrigated peanut production.	2.9
f. Analyze personal characteristics, background experience, and formal education in peanut production.	2.4

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* Responses from 65 Peanut Growers in 7 states. Survey conducted by Department of Agricultural Education, Oklahoma State University, Stillwater, Oklahoma 74074.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.	Production economics.		3.0
	a.	Calculate and use efficiency factors to determine least cost and maximum return to enterprise.	3.2
	b.	Analyze results obtained from the modification or adoption of new practices and compare results with those obtained from experimental studies and demonstration plots.	3.2
	c.	Determine a cash flow budget for peanut production.	3.0
	d.	Determine cost and return for dryland vs. irrigated peanut production.	2.9
	e.	File peanut production records for post production analysis.	2.9
3.	Soil analysis and fertilizer application.		3.3
	a.	Prepare a soil sample for testing and interpret results.	3.6
	b.	Interpret soil pH test and the optimum range for peanut production.	3.6
	c.	Recognize the importance of timing and proper fertilizer placement for peanut production.	3.2
	d.	Recognize the various methods of fertilizer application and plan fertilization program for peanut enterprise.	3.2
	e.	Determine the rate of fertilization per application to receive maximum return per (fertilizer) unit applied (lbs. applied per acre).	3.2
	f.	Determine soil moisture conditions.	3.1
	g.	Visually identify approximate plant nutrient deficiency symptoms.	3.1
4.	Irrigation.		2.3
	a.	Determine the minimum requirements that pertain to the design, installation, and performance of sprinkler and furrow irrigation equipment and availability of fuel.	2.6
	b.	Determine water requirements of peanuts and be able to use water measurements and conversion factors.	2.3
	c.	Be familiar with state and local stream rights and ground water policy.	2.2
	d.	Consider water quality, interpret water analysis reports, use of water classification tables, and availability of water supply.	2.1
5.	Agricultural chemicals.		3.6
	a.	Herbicides.	3.7
		(1) Calibrate herbicide applicators.	3.8

(2) Identify weeds that are a major nuisance for peanut growers within local community and plan effective herbicide or cultural weed control program. 3.7

(3) Identify current weed control practices and evaluate their effectiveness (pre-emergence, post-emergence, cost, rate, methods, and dangers). 3.6

b. Insecticides. 3.6

(1) Identify insect pests that are major nuisances to peanut production in your locality and insect damage to peanuts. 3.7

(2) Identify current insect control programs and evaluate their effectiveness (cost, form, rate of application, method of application, and dangers). 3.6

(3) Identify Nematode damage and plan effective control. 3.6

(4) Calibrate pesticide applicators. 3.6

(5) Plan effective insect control program and compare the advantages and disadvantages of chemical control vs. cultural control. 3.2

c. Fungicides (plant diseases). 3.6

(1) Identify plant diseases that are of major concern to peanut production in your locality and disease damage to peanuts (Cercospora leafspot, Fusarium, Rhizoctonia, etc.). 3.8

(2) Plan an effective peanut disease control program and be able to calibrate fungicide applicators. 3.7

(3) Distinguish between nutritional deficiencies, fertilizer damage, chemical damage, insect damage, insect-borne diseases, fungi-borne diseases, and viruses. 3.6

(4) Identify current plant disease control practices and evaluate their effectiveness for your local area (cost, form, rate, method of application, and dangers) and compare the advantages and disadvantages of chemical vs. cultural control. 3.5

6. Variety selection. 3.2

a. Select variety or strain best suited to local conditions (soil, growing season, yield, and insect and disease resistance, etc.). 3.6

b. Select variety or strains that are known for producing quality peanuts at harvest that yield a high percentage of sound mature nuts that are a high protein and high in oil content. 3.5

c. Select variety or strains that are adaptable to modern harvest, drying, and storage methods.	3.2
d. Evaluate certified seed tag analysis.	3.1
e. Select variety or strains that respond efficiently to irrigation fertilizer application.	2.7
7. Tillage practices.	3.4
a. Planting methods.	3.6
(1) Calibrate or set planters to get desired number of plants per linear foot.	3.6
(2) Evaluate the most modern practices pertaining to number of plants per foot (linear ft.), depth of planting, width of row, plant spacing, method of planting, etc.	3.5
b. Seedbed preparation.	3.3
(1) Identify the characteristics of a good seedbed.	3.5
(2) Operate modern farm equipment to prepare production location for long term utilization (land leveling or grading, installation of irrigation systems, drainage, and preparation of seedbed for planting).	3.2
c. Cultivation practices.	3.3
(1) Identify the proper equipment needed for field cultivation.	3.3
8. Equipment repair.	2.6
a. Cooling systems.	3.1
(1) Repair, service and/or replace water pumps, water hoses, air baffles, thermostats, antifreeze, and coolants.	3.1
b. Fuel systems.	2.7
(1) Repair and service fuel systems (fuel pumps, carburetor, injection pumps, nozzles, fuel filters, etc.) for diesel, gasoline, LP and/or natural gas.	2.7
c. Electrical system.	2.6
(1) Diagnose, repair and/or service ignition, generator, starter, and light systems.	2.6
d. Power trains and hydraulics.	2.6
(1) Have basic understanding of hydraulics (pumps, motors, controls and filters).	2.7

(2) Repair and/or service clutch system, differentials, power take-off, hydraulic life, brake system, steering system, etc.	2.5
e. Welding.	2.2
(1) Arc weld, acetylene weld, bronze mild steel or cast iron.	2.2
(2) Hardsurface plow shares, worn cutting surfaces and worn equipment parts.	2.2
9. Harvesting, storing and drying methods.	3.7
a. Determine peanut maturity, soundness, and moisture content.	3.8
b. Determine harvest losses and make necessary machine adjustments (digger and/or combine).	3.8
c. Select harvesting and drying methods and storage facilities based on efficiency.	3.5
10. Marketing.	2.9
a. Identify and intepret peanut market information (cash sales, contracts, and government price support programs).	3.1
b. Determine grade or quality requirements of peanuts and discount the price of the kernels due to maturity, soundless, moisture content, screen size, and shriveled kernels, etc.	3.1
c. Identify peanut marketing outlets (processors, oil, candy, peanut butter, salted nuts, livestock feed-peanut meal, government storage).	2.5

POTATO PRODUCER

Other Titles: Commercial Potato Production Worker, Potato Grower, Potato Farmer.

Job Description:

The experience commercial Potato Production Worker selects the land, prepares it for planting, determines soil nutrient requirements, plans a fertility program, and applies fertilizers, determines soil moisture requirements, plans and applies an irrigation program; evaluates, selects, and prepares seed potatoes; determines time and methods of planting, plants the crop, evaluates weed control methods; and plans and applies a weed control program; determines degree of insect threat, compares control methods, plans and applies an insect control program, recognizes disease symptoms, evaluates control methods, and plans and applies a disease control program; selects harvesting and storage methods, determines time to harvest, and operates harvest and storage equipment; evaluates market news, marketing systems, and buyer-seller contracts; sells potato crop, calculates profits, and analyzes future production; operates and maintains the machinery and equipment, and maintains the buildings and structures.

Competencies Identified and Validated

N = 55*

Competencies		Weighted Mean**
1.	Understanding the potato industry.	1.5
a.	Evaluate opportunities in potato production.	2.0
b.	Explain the economic importance of the potato industry as it relates to the public, the state, the nation, and the world.	1.7
c.	Describe government policies that effect potato production.	1.5
d.	Discuss the history of potato production.	1.3
e.	List the amount of potato production in the United States and the world.	1.3
2.	Selecting and preparing the soil.	2.7
a.	Operate tillage equipment and power sources safely.	3.5
b.	Perform field adjustments and minor field repairs on equipment and power sources used in the plowing operation.	3.5

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* Responses from 55 Potato Producers in 10 states. Survey conducted by Department of Agricultural Education, University of Idaho, Moscow, Idaho 83843.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Compare methods of seedbed preparation.	2.7
d.	Develop a good system of crop rotation for soil building and soil sanitation.	2.4
e.	Recognize land possessing the physical conditions, native fertility, and gross topography suitable for potato production.	2.2
f.	Determine seasonal availability of water required for potato production.	2.2
g.	Evaluate advantages and disadvantages of spring and fall plowing and select proper method for local situations.	2.2
3.	Selecting, obtaining, and preparing seed potatoes.	2.6
a.	Operate seed cutting machinery safely.	3.5
b.	Perform adjustments and minor repairs on seed cutting equipment	3.3
c.	Understand the purposes and methods of potato seed treatment.	2.8
d.	Prepare seed pieces of desirable size and number of eyes per piece.	2.8
e.	Determine amount of potato seed required.	2.4
f.	Compare the advantages and disadvantages of certified and non-certified or home-saved seed potatoes.	2.3
g.	Explain storage methods and requirements of seed potatoes.	2.3
h.	Identify and select varieties best suited for local conditions.	2.2
i.	Select potato varieties according to utilization (chips, fries, etc.).	2.0
j.	Evaluate the effect of potato seed varieties on yield responses.	1.9
4.	Establishing potato crops.	2.9
a.	Perform field adjustments and minor field repairs on planting equipment and power sources.	3.6
b.	Operate planting equipment and power sources safely.	3.6
c.	Calibrate and adjust planters for rate and depth of planting.	3.4
d.	Care for potato seed pieces before planting.	3.3
e.	Determine depth of planting.	3.0
f.	Determine rate of planting.	2.9
g.	Determine soil and moisture conditions necessary for planting.	2.6
h.	Study local weather conditions at time of planting.	1.9
i.	Recognize seasonal weather variations to estimate planting time for optimal growing conditions.	1.9

5.	Selecting and implementing irrigation methods.	2.2
a.	Operate irrigation equipment safely.	3.2
b.	Perform field adjustments and minor field repairs on irrigation equipment and power sources.	3.0
c.	Set up irrigation equipment.	2.9
d.	Identify soil and plant conditions indicating irrigation needs.	2.6
e.	Measure and control water distribution.	2.5
f.	Evaluate the effects of moisture on quantity and quality of potato crop.	2.4
g.	Determine irrigation schedules for greatest economic gains.	2.3
h.	Evaluate economic importance of recommended irrigation practices.	1.9
i.	Evaluate various irrigation methods and systems.	1.9
j.	Determine added costs and returns from proper irrigation.	1.9
k.	Determine the type and slope of soil.	1.8
l.	Determine available water supply.	1.7
m.	Determine cost of installation and cost of operating an irrigation system.	1.6
n.	Select an irrigation system according to needs and costs.	1.6
o.	Interpret federal and state laws relating to water rights and uses.	1.6
6.	Selecting and using fertilizers and soil conditioners.	2.3
a.	Perform field adjustments and minor field repairs on fertilizer equipment and power sources.	3.5
b.	Operate fertilizer application equipment and power sources safely.	3.4
c.	Calibrate fertilizer application equipment.	3.1
d.	Take soil samples.	2.2
e.	Identify nutrient deficiency symptoms in growing plants.	2.2
f.	Evaluate the effect of fertilizer use on yield responses.	2.2
g.	Identify nutrient requirements in potato production.	2.0
h.	Interpret and use soil test results.	2.0
i.	Determine when to apply fertilizers and soil conditioners.	2.0
j.	Determine amount of fertilizer and soil conditioners to apply.	1.9
k.	Compare cost per unit of nutrient from available fertilizer sources.	1.8

l.	Determine the most economic combination of potato nutrient sources.	1.7
m.	Compare costs of fertilizer application methods.	1.7
7.	Controlling weeds.	2.8
a.	Apply weed control chemicals correctly and safely.	3.5
b.	Operate mechanical weed control equipment, herbicide application, equipment, and power sources safely.	3.5
c.	Perform field adjustments and minor field repairs on weed control equipment and power sources.	3.5
d.	Read and comply with manufacturer's label directions and legal requirements affecting recommended herbicide application, timing, and safety.	3.4
e.	Calibrate herbicide application equipment.	3.4
f.	Store, mix, and handle herbicides conforming to manufacturer's label directions.	3.3
g.	Meet state requirements for herbicide use.	3.1
h.	Recognize dangers of carry-over of herbicide residues in the soil and in application equipment.	3.0
i.	Evaluate the influence cultivation has on yields, soil temperature, and soil moisture.	2.3
j.	Identify common weeds.	2.3
k.	Recognize weed infestation problems and select the best method of control.	2.2
l.	Appraise the performance of recommended herbicides.	2.2
m.	Evaluate economic impact of weeds on potato crop.	2.2
n.	Identify the methods with which weeds spread.	1.9
8.	Controlling insects.	2.8
a.	Operate insect control equipment and power sources safely.	3.5
b.	Perform field adjustments and minor field repairs on insect control equipment and power sources.	3.4
c.	Calibrate insecticide application equipment.	3.3
d.	Identify dangers of insecticide residue carry-over in application equipment.	3.3
e.	Read and comply with manufacturer's label directions and legal requirements affecting recommended insecticide application, timing, and safety.	3.3
f.	Store, mix, and handle recommended potato insecticides conforming to manufacturer's label directions.	3.3

g.	Detect insect infestation.	2.9
h.	Meet state requirements for use of E.P.A. designated "Restricted Pesticide".	2.8
i.	Identify and evaluate damage caused by insects to potato crop.	2.5
j.	Identify and distinguish between harmful and beneficial potato crop insects.	2.5
k.	Appraise performance of recommended insecticides.	2.3
l.	Select the best insect control program in terms of economic costs, returns, and environmental impact.	2.2
m.	Evaluate life cycle of insects to determine appropriate control procedures.	2.2
n.	Identify methods by which insects are spread.	2.1
9.	Controlling diseases.	2.8
a.	Operate disease control equipment and power sources safely.	3.4
b.	Perform field adjustments and minor field repairs on disease control equipment and power sources.	3.4
c.	Calibrate disease control applicators correctly.	3.3
d.	Clean and disinfect all potato equipment and storage facilities with live steam or chemicals to control potato diseases.	3.3
e.	Read and comply with manufacturer's label directions and legal requirements affecting recommended fungicide application, timing, and safety.	3.2
f.	Interpret and follow chemical label directions for fungicide storing, mixing, and handling.	3.1
g.	Identify dangers of chemical carry-over of fungicide residues in soil and application equipment.	3.0
h.	Meet state requirements for fungicide use.	2.9
i.	Identify potato diseases and interpret their effect on potato crops.	2.6
j.	Identify and appraise the performance of recommended fungicides.	2.0
k.	Identify the methods by which diseases are spread.	2.0
l.	Evalute environmental impact of disease control programs.	1.9
m.	Select a recommended disease control program in terms of expected costs and returns.	1.8

10.	Harvesting potato crop.	2.6
a.	Operate potato harvest equipment and power sources safely.	3.5
b.	Determine correct field travel and PTO speed for harvesting operation.	3.5
c.	Perform field adjustments and minor field repairs on harvest equipment.	3.4
d.	Identify weather and soil conditions essential for maximum harvest efficiency and minimum bruising and injury.	2.6
e.	Determine potato crop maturity.	2.5
f.	List and evaluate vine-killing methods to hasten potato maturity.	2.1
g.	Evaluate weather conditions and forecasts in local area.	2.0
h.	Compare and evaluate available potato harvest equipment for local needs.	2.0
i.	Calculate expected costs and returns of custom versus farm-owned harvest equipment.	1.5
11.	Storing and handling potato crop.	2.9
a.	Operate potato handling equipment safely.	3.7
b.	Adjust, maintain, and repair potato handling equipment.	3.5
c.	Identify proper filling and removal practices to reduce potato damage.	3.3
d.	Evaluate economic impact of careless potato crop handling.	3.2
e.	Provide and maintain proper storage temperature, humidity, and air circulation to minimize economic loss depending on intended use of crop (seed, fresh, processing).	3.1
f.	Compare and evaluate available storage facilities.	2.1
g.	Evaluate washing, grading, and packing methods in relation to costs and returns.	1.8
12.	Marketing potato crop.	1.7
a.	Inspect potatoes for damages and defects.	2.9
b.	Identify various grades of potatoes.	2.6
c.	Calculate expected returns and profits from sales.	1.6
d.	Select appropriate marketing system.	1.5
e.	Select carriers to ship potatoes.	1.4
f.	Interpret payment terms and other contract agreements.	1.4
g.	Negotiate buyer-seller contracts.	1.4
h.	Interpret production statistics and market reports.	1.4

	i.	Determine feasibility of participating in potato futures market and contracts.	1.3
	j.	Analyze market cycles.	1.3
13.	Analyzing production.		1.6
	a.	Evaluate the role of potato production in the local farming program.	1.8
	b.	Summarize and evaluate yearly production records.	1.7
	c.	Calculate anticipated profits from future production.	1.6
	d.	Evaluate future seasonal and yearly production and demand forecasts.	1.5
14.	Maintaining equipment and power sources.		2.9
	a.	Perform proper maintenance and servicing of machinery according to operator's manual.	3.5
	b.	Inspect equipment for potential breakdowns and safety hazards.	3.4
	c.	Prepare equipment for storage and removal from storage.	3.2
	d.	Perform major repairs on equipment and power sources (i.e., replace universal joints, replace bearings and seals, etc.).	3.1
	e.	Maintain records of maintenance and repair of machinery and equipment.	2.8
	f.	Maintain a daily log of number of hours each piece of equipment is used.	2.4
	g.	Compare and select equipment and power sources best suited for local operation.	2.2

RICE GROWER

Other Titles: Rice Farmer, Rice Producer, Rice Farm Worker, Rice Farm Manager, Rice Food Producer.

Job Description:

The Rice Grower plans for the rice crop to achieve highest yields and financing; grows the crop with management practices to achieve the highest and best quality of rice; harvests the rice crop and transports it to market; operates machines and equipment safely and does routine maintenance throughout the year; keeps records for management and tax purposes; and supervises employees of the rice farm operation.

Competencies Identified and Validated

N = 33*

Competencies	Weighted Mean**
1. Plan the rice crop.	3.1
a. Determine cost of growing rice crop.	3.6
b. Plan crop rotation.	3.5
c. Realize personal shortcomings and work to overcome them.	3.4
d. Calculate profit potential.	3.2
e. Select proven varieties for area.	3.1
f. Upgrade knowledge of rice production through magazines, adult classes, etc.	2.9
g. Understand how to use credit.	2.9
h. Understand supply and demand theory.	2.6
i. Understand how rice fits in with other crops grown on the farm.	2.6
2. Grow crop.	3.3
a. Time fertilizer applications properly.	3.7
b. Control unwanted vegetation by proper use of herbicides.	3.6
c. Run soil test.	3.4
d. Prepare the soil for rice crop.	3.3
e. Select good seed stock.	3.3
f. Use proper irrigation methods.	3.3
g. Control insects and diseases.	3.1
h. Control animal and bird pests.	3.1
i. Survey and construct levees.	3.0
j. Understand environmental effects on rice grades and yields.	3.0

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* Responses from 33 Rice Growers in four states. Survey conducted by Vocational Agricultural Department of Stuttgart High School, Stuttgart, Arkansas, and Department of Agricultural Education, University of Arkansas, Fayetteville, Arkansas 72701.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Harvest crop.	2.9
a.	Prepare equipment in advance for harvest.	3.6
b.	Know when to drain rice.	3.0
c.	Plant for a staggered harvest.	3.0
d.	Have enough part-time labor to deliver rice to mill.	3.0
e.	Have planned purchase or rental of equipment to facilitate speedy harvest.	2.9
f.	Operate harvesting equipment safely.	2.9
g.	Know best route from farm to mill.	2.4
4.	Operate equipment.	2.9
a.	Recognize malfunctions in equipment.	3.5
b.	Service equipment according to operator's manual.	3.3
c.	Use safety standards relating to the operation of a particular piece of machinery.	3.0
d.	Adjust equipment under field conditions for maximum efficiency.	3.0
e.	Become familiar with operator's manual for each piece of equipment.	3.0
f.	Operate machinery and equipment under a variety of field conditions.	3.0
g.	Prepare machines and equipment for storage.	2.7
h.	Attach accessory equipment to basic power unit.	2.6
i.	Maintain records of maintenance and repair of machinery and equipment.	2.6
j.	Hold a valid operator's license where necessary.	2.2
5.	Keep records.	2.5
a.	Know basic bookkeeping techniques.	2.8
b.	Follow set depreciation.	2.7
c.	Keep individual field records.	2.7
d.	Know basic tax structure for agricultural operations.	2.6
e.	Keep yield records.	2.5
f.	Keep individual machinery records.	2.1
6.	Supervise workers.	3.1
a.	Assist in planning work schedules of employees.	3.4
b.	Train workers for various jobs.	3.1
c.	Judge prospective employee qualifications.	3.1
d.	Observe employee compliance to safety regulations.	3.0
e.	Develop harmonious relationships with workers.	2.9
f.	Suggest to workers improvements of methods of accomplishment of work.	2.9

SMALL FRUIT FARMING

Other Titles: Berry Grower, Fruit Farmer, Fruit-Farm Manager, Commercial Producer of Blueberries, Grapes, Raspberries, and/or Strawberries, Blueberry Grower, Raspberry Grower, Strawberry Grower, Vine Grower, Vineyard Manager, Fruit Gardner.

Job Description:

A commercial producer of small fruit is a person competent in managerial and technical skills needed to carry out timely approved practices resulting in maximum profit from the small-fruit enterprises. These skills are needed by owners, managers, and operators. The broad competency areas needed by small fruit producers are as follows: Planning for Production, including acquiring technical knowledge, managing finances, site and variety selection, and site preparation; Growing Small Fruit Crops, including, soil preparation, propagation and planting, fertilization, pest control, machinery selection and maintenance; Harvesting, Processing, Storing and Marketing Small-Fruit Crops, including those operations involved in commercial marketing or operating a pick-your-own outlet.

Competencies Identified and Validated

	Weighted Means by Occupation**			
Competencies	Blueberries N = 40	Grapes N = 69	Raspberries N = 34	Strawberries N = 33
1. Plan to grow small-fruit crops.	3.1	3.2	3.2	3.1
a. Select proven, disease resistant, locally adapted, high-producing varieties of plants which are suitable for the chosen markets.	3.5	3.4	3.8	3.9
b. Select appropriate site for the small-fruit planting.	3.7	3.6	3.6	3.6

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* Responses from Commercial Producers of Fruit in 18 states. Survey conducted by Department of Vocational Education, University of Kentucky, Lexington, Kentucky 40506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Competencies	Blueberries	Grapes	Raspberries	Strawberries
c. Realize shortcomings and work to overcome them through study and consultation with experts.	3.0	3.7	3.1	3.4
d. Determine costs in establishing and operating the small-fruit planting.	3.2	3.5	3.3	3.4
e. Lay out the planting plan.	3.0	3.0	3.2	3.2
f. Upgrade knowledge of fruit production through trade journals, technical meetings, grower association, etc.	2.7	2.9	3.0	3.1
g. Prepare the site for long-term utilization in small fruit (grading terracing, installing tile, or draining).	3.2	3.4	3.4	3.1
h. Calculate profit potential in establishing the small-fruit enterprise.	3.1	3.5	3.5	3.1
i. Understand supply and demand aspects of small fruit production.	2.8	3.0	3.1	3.1
j. Analyze personal characteristics, education, and background in small-fruit production.	2.5	2.4	2.6	2.6
2. Grow small-fruit crops.	3.0	2.9	3.1	3.0
a. Mix and apply chemicals properly.	3.5	3.6	3.8	3.8
b. Provide strict safety and control of pesticides and other chemicals used in the operation.	3.4	3.4	3.7	3.6
c. Prepare soil for planting (cultivation, acidification, fertilization).	3.4	3.4	3.7	3.6
d. Plant or transplant the stock properly.	3.0	3.4	3.7	3.6
e. Control unwanted vegetation, with herbicides.	3.0	2.6	3.2	3.6

Competencies	Blueberries	Grapes	Raspberries	Strawberries
f. Control insect pests and related organisms on the small-fruit planting.	3.5	3.6	3.7	3.6
g. Control diseases in the small-fruit planting.	3.5	3.6	3.7	3.6
h. Secure planting stock.	3.4	3.6	3.7	3.5
i. Cultivate the small-fruit planting.	2.5	3.0	3.2	3.4
j. Give extra care to developing plants.	2.9	3.2	3.3	3.3
k. Prepare stock for planting.	2.4	3.5	3.2	2.9
l. Repair, maintain, and replace machinery and equipment used in fruit production.	3.0	3.2	3.0	2.9
m. Control bird and animal pests.	3.2	2.9	2.7	2.7
n. Maintain proper soil reaction through acidification or liming.	2.9	2.5	2.8	2.7
o. Train the plants for ease of handling and optimum production.	2.7	3.3	2.8	2.5
3. Harvest, process, store, and market the small-fruit crop.	2.5	2.3	2.7	2.6
a. Secure adequate picking containers.	3.1	3.0	3.0	3.5
b. Supervise the pickers for careful handling of the crop.	3.1	2.8	3.6	3.5
c. Plan for proper timing of harvest to catch blueberries at their prime stage of ripeness.	3.3	3.4	3.6	3.4
d. Provide shelter for newly picked fruit.	3.0	2.2	3.1	3.1
e. Secure qualified pickers in sufficient numbers per acre.	2.7	2.7	3.4	3.0
f. Pack containers to proper fullness.	2.7	2.1	2.7	3.0

Competencies	Blueberries	Grapes	Raspberries	Strawberries
g. Arrange cool storage of the fruit.	2.5	2.0	2.8	2.2
h. Adjust harvesting equipment for minimum damage to the fruit.	2.8	3.2	2.4	2.0
i. Process small fruit for market.	2.5	1.7	1.8	1.7
j. Arrange for refrigerated shipping to distant markets.	2.6	1.9	2.2	1.7
4. Operate a pick-your-own (customer picks) outlet.	2.5	2.1	2.8	2.9
a. Provide field supervision of picking.	3.0	2.2	3.4	3.5
b. Provide supporting facilities such as roads, parking, playground, restrooms, drinking fountains, convenient scales, and check out, etc.	2.6	1.9	3.2	3.3
c. Plan for staggered ripening of small berries.	3.0	2.1	2.8	3.0
d. Provide containers.	2.6	2.1	2.8	2.9

SMALL GRAIN PRODUCERS

Other Titles: Farmer, Cash Grain Grower, Grain Farmer.

Job Description:

Plants, cultivates, and harvests one or more small grain crops, such as barley, oats, rice, or wheat for cash sales. Selects and buys type and amount of grain to be grown, taking into consideration local growing conditions and market demands. Operates equipment to plow, disk, harrow, and fertilize ground for planting, and to plant grain. Plans harvesting, considering ripeness and maturity of grain and weather conditions and operates grain-harvesting equipment, sells grain or stores grain for future sale.

Competencies Identified and Validated

N = 31*

Competencies			Weighted Mean**
1.	Introduction.		2.7
	a.	Select the correct type of small grain for a given farm situation.	3.2
	b.	Recognize the advantages and disadvantages of small grain production.	2.8
	c.	Identify the specialized uses of oats, barley, wheat, multi-grain, rye, triticale, grain sorghum and other small grain.	2.7
	d.	Interpret the trends of small grain production.	2.7
	e.	Identify occupational opportunities related to small grain production.	2.4
	f.	Recognize the importance of small grains in daily living.	2.3
2.	Seed selection.		2.7
	a.	Read and evaluate a seed tag.	3.3
	b.	Adjust seeding rates depending on the quality of the lot selected.	3.2
	c.	Recognize the requirements for seed certification.	2.9
	d.	Calculate the price per pound of pure live seed.	2.8
	e.	Evaluate and select seed depending on the quality of the lot selected.	2.8

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* Responses from 31 Small Grain Producers representing states in the principle small grain producing areas in the United States. Survey conducted by the Department of Agricultural Education, University of Nebraska, Lincoln, Nebraska 68583.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Clean and treat seeds for planting and/or sale.	2.7
	g.	Identify the parts of small grain seeds and explain the function of each part.	2.1
	h.	Operate a seed germinator.	1.9
	i.	Quote the State Seed Law.	0.9
3.	Seedbed preparation.		3.0
	a.	Prepare a good seedbed.	3.3
	b.	Identify the characteristics of a good seedbed.	3.0
	c.	Compare different depths of planting for various small grains.	2.9
	d.	Recognize tillage equipment to be used in seedbed preparation.	2.9
	e.	Analyze the comparative costs of different production methods.	2.8
4.	Planting.		2.8
	a.	Calibrate seeding equipment.	3.2
	b.	Recommend the proper seeding rate and adjust that rate for seed quality.	3.0
	c.	Explain the value of seeding early.	2.9
	d.	Seed small grain.	2.8
	e.	Identify the types of planting equipment.	2.6
	f.	Select planting mixtures of small grains to be used as a nurse crop.	2.6
	g.	Compare drilling to broadcast seeding.	2.4
5.	Fertilizer rates and applications.		2.9
	a.	Develop a fertilization program for small grains and the subsequent forage crop.	3.0
	b.	Make fertilizer application to small grains.	3.0
	c.	Identify nutrient deficiency symptoms in small grains.	2.9
	d.	Recognize the value of fertilizer in the yield of grain and straw.	2.9
	e.	Describe the nutrient requirements for small grains.	2.9
	f.	Recognize the effect of fertilizer rates on tillering and lodging.	2.9
6.	Pests - weeds, insects, and diseases.		2.5
	a.	Identify insect and disease pests responsible for significant economic loss in small grain production.	2.7
	b.	Recommend cultural and chemical practices for broadleaf and grassy weeds control in small grains.	2.5

c.	Recommend cultural and chemical practices for insect and disease control in small grains.	2.5
d.	Control pests of small grains on home farm or on school land laboratory.	2.4
7.	Harvesting and storing.	2.5
a.	Measure harvesting losses and determine the necessary machine adjustments.	3.2
b.	Determine the moisture content of harvested grain.	2.9
c.	Select a harvesting method and storage system based on efficiency and economy.	2.9
d.	Recognize the relative advantages and disadvantages of harvesting small grains - silage, high moisture grain, or dry grain.	2.5
e.	Discuss the storage facilities needed for various harvesting methods.	2.5
f.	Identify the proper state of grain development for optimum silage production.	2.4
g.	Compare windrow harvesting to harvesting the grain standing.	2.1
h.	Identify the steps in quality silage production.	1.9
8.	Marketing.	2.7
a.	Market small grain to the best advantage.	3.4
b.	Determine market grade requirements for various small grains.	2.8
c.	Select the months when it would be most profitable to market various small grains.	2.8
d.	Discount the price of small grains for test weight, moisture, and damage.	2.7
e.	Locate market outlets for small grains.	2.7
f.	Collect and interpret grain market information.	2.7
g.	Identify several sources of market information.	2.7
h.	Calculate grain shrinkage.	2.6
i.	Explain influence of supply and demand on price of small grain.	2.5
j.	Explain where and how local market prices are set.	2.5
9.	Production economics.	2.7
a.	Budget the annual costs and returns for various small grains.	2.8
b.	Keep and analyze production records for the various small grains.	2.8
c.	Calculate various efficiency factors in producing small grains.	2.7
d.	Set realistic goals for a grain production enterprise.	2.7

CROP PRODUCERS - GENERAL

Other Titles: Farmer, Grain Farmer, Cash Grain Grower.

Job Description:

Plants, cultivates, and harvests one or more grain crops, such as barley, corn, rice, soybeans, or wheat for cash sales. Selects and buys type and amount of grain seed to be grown, taking into consideration local growing conditions and market demands. Operates equipment to plow, disk, harrow, and fertilize ground for planting, and to plant grain. Plans harvesting, considering ripeness and maturity of grain and weather conditions and operates grain harvesting equipment. Sells grain or stores grain for future sales.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Insects.	2.8
a. Identify the major crop pests of corn, soybeans, small grains, and forages.	3.2
b. Recommend cultural and chemical methods of insect control.	3.2
c. Identify plant damage due to insects and estimate the percentage of infestation.	3.0
d. Recommend control methods for insect damage in stored grain.	2.9
e. Identify insects which damage stored grain.	2.7
f. Classify insect pests as chewing, sucking, internal feeding, insects.	2.5
g. Identify insect pests that are irritants, disease carriers, or harmful to man or livestock.	2.5
h. Trace the life cycle of major crop insects.	2.2
2. Diseases.	2.9
a. Identify the major diseases of corn, soybeans, small grains, and forages.	3.2
b. Recommend cultural practices and chemicals that will help control specific plant diseases.	3.0

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* Responses from 30 Crop Producers representing states in the principle cash crop producing area of the United States. Survey conducted by the Department of Agricultural Education, University of Nebraska, Lincoln, Nebraska 68583.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	c.	Identify the agents and conditions that cause plant diseases and the plants that are affected.	2.8
	d.	Estimate the economic loss due to decreased yield, increased harvesting loss or reduced quality caused by diseases.	2.7
3.	Weeds.		2.7
	a.	Identify plants that are poisonous to livestock or irritants to man.	3.2
	b.	Recommend available chemical control for specific weed problems in major economic crops.	3.1
	c.	Recommend cultural practices which aid in weed control.	3.1
	d.	Identify primary and secondary noxious weeds.	2.9
	e.	Estimate yield decrease due to weeds.	2.8
	f.	Describe ways that weeds are harmful, i.e., irritants of man, poisonous, or reduce feeding value.	2.5
	g.	Determine ways that common weeds spread and reproduce.	2.5
	h.	Identify other common weeds in the area.	2.3
	i.	Classify weeds as annuals, biennials, perennials.	2.3
	j.	Define "weed".	1.9
4.	Cultural control.		2.8
	a.	Describe the effect of crop rotation, crop residue, and tillage on control of agronomic pests.	3.0
	b.	Describe the effect of fertilization and planting practices on the control of agronomic pests.	3.0
	c.	Compile the cost and consider the timeliness of control of agronomic pests by cultural methods.	2.8
	d.	Identify insect and disease pests that can be prevented or controlled by varietal resistance.	2.6
5.	Chemical control.		3.1
	a.	Store, handle, and apply chemicals effectively and safely.	3.5
	b.	Apply first-aid to victims of chemical contact.	3.5
	c.	Discuss the factors that affect application rate per acre and calibrate the application equipment.	3.2
	d.	Select a specific chemical and application method for the control of a specific agronomic pest.	3.2

e.	Determine the rate of application needed for the desired pest control.	3.2
f.	Calculate the cost of chemical pest control for specific crops.	3.0
g.	Describe the selectivity of a specific chemical, its effect on man and the environment and its residual qualities.	3.0
h.	Discuss the increase in crop production due to chemical pest control.	2.9
i.	Identify plant symptoms of chemical overdose.	2.8
j.	Describe the effect of a specific chemical on a pest. For example, describe the way a chemical kills: soil sterilizer, stomach poison, contact killer, or growth stimulant.	2.6

SOYBEAN PRODUCERS

Other Titles: Farmer, Cash Grain Grower, Grain Farmer.

Job Description:

Plants, cultivates, and harvests soybeans for cash sales. Selects and buys type and amount of seed to be grown, taking into consideration local growing conditions and market demands. Operates equipment to plow, disk, harrow, and fertilize ground for planting, and to plant grain. Plans harvesting, considering ripeness and maturity of grain and weather conditions and operates soybean-harvesting equipment. Sells soybeans or stores them for future sales.

Competencies Identified and Validated

N = 31*

Competencies			Weighted Mean**
1.	Opportunities.		2.5
	a.	Recognize the advantages and disadvantages of soybean production.	2.9
	b.	Interpret the trends in soybean production.	2.8
	c.	Identify the special commercial and industrial uses of soybeans.	2.6
	d.	Recognize the importance of soybeans in daily living.	2.3
	e.	Identify the occupational opportunities related to soybean production.	2.2
2.	Seed selection.		2.9
	a.	Calculate the number of bushels of soybean seed that would be needed to plant a certain number of acres.	3.5
	b.	Select the desired soybean varieties to plant considering maturity, disease resistance, lodging resistance, row spacing, and yield level.	3.4
	c.	Read and evaluate the tag on a bag of soybean seed.	3.3
	d.	Adjust the recommended seeding rate for soybeans to allow for differences in purity, germination, seed size and row width.	3.3
	e.	Determine the days of maturity of different soybean varieties and select those varieties that would be adapted to the local community.	3.3

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* Responses from 31 Soybean Producers representing states in the principle soybean producing area of the United States. Survey conducted by the Department of Agricultural Education, University of Nebraska, Lincoln, Nebraska 68583.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Explain the purpose and procedure in inoculating soybean seed.	2.8
	g.	Describe why one variety matures earlier than another.	2.3
	h.	Distinguish between determinate and indeterminate types of soybean plants.	2.2
	i.	Identify the parts of the soybean seed and explain the functions of each part.	1.8
3.	Seedbed preparation.		2.9
	a.	Prepare a good seedbed for soybeans.	3.2
	b.	Compare the cost of various tillage systems.	3.1
	c.	Identify the characteristics of a good seedbed.	2.9
	d.	Discuss the tillage practices used to prepare a good soybean seedbed.	2.9
	e.	Compare the relative advantages of using minimum tillage and conventional tillage systems in soybean production.	2.7
	f.	Identify and evaluate the various tillage equipment needed to produce a soybean crop.	2.5
4.	Planting methods and practices.		2.9
	a.	Calibrate planting equipment to get the desired planting rate.	3.2
	b.	Evaluate the most recent findings pertaining to time of planting, depth of planting, width of rows, spacing within the rows, and method of planting.	3.1
	c.	Correctly plant soybeans for specific crop.	3.0
	d.	Estimate the number of acres required to pay the cost of changing to narrow row equipment.	2.8
	e.	Identify the types of planting equipment.	2.7
	f.	Explain the advantages and disadvantages of planting soybeans in narrow rows.	2.6
5.	Fertilizers - rates and application.		2.8
	a.	Calculate the rates of fertilizer to apply to get the maximum return per fertilizer dollar invested.	3.1
	b.	Recognize the importance of proper fertilizer placement for soybeans.	3.0
	c.	Plan a fertilizer program for a specific soybean enterprise.	3.0
	d.	Determine where in the cropping system the recommended fertilizer should be applied.	2.9
	e.	Apply fertilizer to soybean enterprise.	2.9
	f.	Identify nutrient deficiency symptoms in soybeans.	2.8
	g.	Recognize the different methods of applying fertilizer to soybeans.	2.7

h.	Determine the optimum pH range for soybean production.	2.6
i.	Describe the importance of the major nutrients, secondary nutrients, and micro-nutrients in the production of soybeans.	2.6
j.	Evaluate plant analysis methods of determining nutrient needs.	2.5
6.	Pests - weeds, insects, and diseases.	3.1
a.	Identify the pests that are of major concern in the production of soybeans in the community.	3.4
b.	Calibrate pesticide applicators.	3.4
c.	Recognize the pesticides being used to control soybean pests; forms, rates, methods of application, effectiveness, costs, and dangers.	3.2
d.	Summarize the precautions which should be followed when using pesticides.	3.2
e.	Identify pest and pesticide damage in soybeans.	3.2
f.	Control pests of soybeans on home farm.	3.1
g.	Recognize the importance of crop rotation.	2.8
h.	Describe the practices being used in the community to control soybean pests and evaluate their effectiveness.	2.8
i.	Compare cultural controls to chemical controls of soybean pests.	2.7
7.	Harvesting and storing.	2.8
a.	Make the necessary adjustments on soybean harvesting equipment for efficient operation.	3.3
b.	Harvest beans with less than one bushel per acre field loss.	3.1
c.	Determine the major sources of soybean harvesting loss, the percentage loss from each source, and the procedure in minimizing each type of loss.	3.0
d.	Obtain a sample of soybeans, determine whether it is ready for harvesting.	3.0
e.	Determine whether it is more economical to own harvesting equipment for soybeans or to hire a custom operator.	2.8
f.	Calibrate the costs of storing soybeans and determine whether it is advantageous to store.	2.8
g.	Select a harvesting and storage system for soybeans based on efficiency and economy.	2.8
h.	Identify materials and methods used in cleaning and fumigating storage structures.	2.6

	i.	Treat stored soybeans for pest control.	2.5
	j.	Calculate the volume of a structure needed to store a specified number of bushels of soybeans.	2.3
8.	Marketing.		2.6
	a.	Market soybeans to best economic advantage.	3.3
	b.	Locate market outlets for soybeans.	2.8
	c.	Determine market grade requirements for soybeans.	2.7
	d.	Explain the purpose of the futures contract in soybean marketing.	2.7
	e.	Discount the price of soybeans for test weight, moisture, and damage.	2.6
	f.	Describe the supply and demand relationship for soybeans.	2.6
	g.	Select the month when it would be most profitable to market soybeans.	2.5
	h.	Identify sources of soybean marketing information.	2.4
	i.	Explain how local soybean prices are determined.	2.4
	j.	Explain the relationship between the livestock industry and the soybean market.	2.3
9.	Production economics.		2.8
	a.	Budget the annual costs and returns in soybean production.	2.8
	b.	Keep and analyze production records for soybean enterprise.	2.8
	c.	Determine results obtained from the modification or adoption of new practices and compare the results with those obtained from experimental studies and local demonstration plot.	2.8
	d.	Calculate various efficiency factors in soybean production.	2.7
	e.	Determine realistic goals in soybean production.	2.7

SUGAR BEET FARMER

Other Titles: Commercial Vegetable Producer, Forage Producer, Farm Manager

Job Description:

The Sugar Beet Farmer produces sugar beets under contract with a sugar beet company. Determines kind and amount of crop to be grown, according to market conditions, weather and size and location of farm. Selects and purchases seed, fertilizer and farm machinery and arranges with buyers for sale of crop. Hires and directs farm workers engaged in planting, cultivating and harvesting the crop. Performs various duties of farm workers, depending on size and nature of farm, including setting up and operating farm machinery.

Competencies Identified and Validated

N = 432*

Competencies		Weighted Mean**
1.	Perform general management operations.	3.0
a.	Adjust management to meet weather conditions.	3.5
b.	Do own bookkeeping.	3.5
c.	Prepare a farm income tax return.	3.4
d.	Negotiate the purchase of equipment.	3.4
e.	Negotiate leases.	3.3
f.	Negotiate production credit, bank, etc.	3.3
g.	Plan a farm budget.	3.2
h.	Store farm equipment.	3.2
i.	Maintain a farm inventory.	3.1
j.	Employ a certified public accountant.	2.3
k.	Utilize a hired bookkeeper.	1.7
2.	Plan schedules of production.	3.2
a.	Schedule farm work when needed.	3.7
b.	Supervise farm labor.	3.6
c.	Purchase certified seed.	3.5
d.	Hire farm labor.	3.3
e.	Test seed varieties.	2.9
f.	Treat seed varieties.	2.9
g.	Utilize schedule for harvesting by sugar beet company with cooperation from association.	2.9
h.	Utilize sugar beet association for assistance.	2.8

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* Responses from 432 Sugar Beet Farmers in 3 states. Survey conducted by Department of Agricultural Education, Utah State University, Logan, Utah 84321.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Interpret soil conditions.		3.1
	a.	Utilize soil test information for insect control.	3.9
	b.	Utilize soil test information for production per acre.	3.2
	c.	Experiment with crop rotation.	3.2
	d.	Take soil nitrogen fertilizer tests.	3.1
	e.	Utilize soil test information for sugar percentage.	2.9
	f.	Utilize soil test information for weed control.	2.8
	g.	Utilize the petiole nitrate tests.	2.8
4.	Diagnosing pest injury.		3.0
	a.	Identify nematode injury.	3.4
	b.	Identify root rot magot.	3.3
	c.	Utilize services of company fieldman.	3.2
	d.	Diagnose curley top disease.	3.1
	e.	Control leafhoppers.	3.0
	f.	Identify virus yellow disease transmitted by aphid.	2.9
	g.	Identify grasshoppers.	2.9
	h.	Identify leafhoppers.	2.9
	i.	Identify weeds.	2.9
	j.	Utilize services of agricultural research service ARS.	2.9
	k.	Utilize services for cooperative extension.	2.8
5.	Handling pesticides.		3.3
	a.	Follow safety precautions when applying pesticides.	3.8
	b.	Utilize chemical pesticides on farm.	3.4
	c.	Use pesticides by grower.	3.3
	d.	Use barnyard and green manures.	3.2
	e.	Schedule determined by technical assistance.	3.0
6.	Fertilizing methods.		3.2
	a.	Figure how much to apply per acre.	3.5
	b.	Figure the kind of nitrogen fertilizer to apply.	3.3
	c.	Schedule when to use nitrogen fertilizer.	3.2
	d.	Use barnyard and green manures.	3.2
	e.	Schedule determined by technical assistance.	3.0
7.	Planting methods.		3.0
	a.	Prepare seed bed before planting.	3.9
	b.	Select earliest possible date to plant.	3.8
	c.	Use an incorporated method in applying fertilizers and pesticides.	3.1
	d.	Use pelleted seed.	2.6
	e.	Use non-pelleted seed.	2.3
	f.	Incorporate fertilizer only when planting.	2.1

8.	Harvesting methods.	2.6
a.	Utilize the multiple row harvester.	3.0
b.	Utilize the tank type lifting method.	2.7
c.	Utilize the lifter loader method.	2.6
d.	Utilize the flailing method.	2.5
e.	Utilize the mechanical topping method.	2.5
f.	Utilize the single row harvester.	2.1
9.	Irrigating methods.	3.1
a.	Design irrigation systems.	3.5
b.	Select watering schedule for beets.	3.5
c.	Repair irrigation systems.	3.4
d.	Use sprinkler and furrow irrigation only.	3.2
e.	Use furrow type irrigation only.	2.9
f.	Use sprinkler irrigation only.	2.5
g.	Use company advisory personnel for water schedules.	2.4
10.	Operating equipment correctly.	3.7
a.	Operate, maintain, and repair planting equipment.	3.8
b.	Operate, maintain, and repair beet harvester.	3.8
c.	Adjust harvester to eliminate unnecessary damage to beet.	3.8
d.	Operate, maintain, and repair cultivation equipment.	3.7
e.	Operate, maintain, and repair thinning equipment.	3.7
f.	Operate tractors.	3.6
g.	Operate, maintain, and repair fertilizer equipment.	3.5

SWEET POTATO FARMER

Other Titles: Sweet Potato Producer, Sweet Potato Grower.

Job Description:

Persons involved in this occupation must know best soil types and soil nutrient requirements for sweet potato production; must prepare land for planting; plant and cultivate the growing crop; recognize sweet potato diseases and insects and the controls for each; harvest the mature crop; cure and store the crop until marketed; and keep the records needed in any business enterprise.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Soil test and land area analysis.	3.5
a. Know soil type best for sweet potatoes.	3.8
b. Determine pH of the soil.	3.5
c. Determine the soil nutrients needed.	3.5
d. Determine moisture and other climatic needs.	3.5
e. Determine contour if necessary.	3.4
f. Make necessary nutrient deficiency adjustment.	3.3
2. Preparation of land and planting.	3.6
a. Locate planting site.	3.7
b. Prepare seed bed.	3.7
c. Plant.	3.7
d. Grow sweet potato slips.	3.6
e. Develop crop rotation plans.	3.4
3. Machinery and its maintenance.	3.6
a. Select adequate sweet potato planting equipment.	3.8
b. Select proper sweet potato cultivating equipment.	3.6
c. Overhaul, repair, and proper maintenance of sweet potato equipment.	3.6
d. Machine shop work.	3.4
4. Select variety.	3.4
a. Know variety needed for markets.	3.7

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* Responses from 30 Sweet Potato Producers in Louisiana. Survey conducted by Department of Agricultural Education, Louisiana State University, Baton Rouge, Louisiana 70803.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Know planting date.	3.5
	c.	Know maturity time.	3.2
	d.	Calculate yield.	3.2
	e.	Know retort use.	3.3
	f.	Know formula.	3.2
	g.	Know proper can fill.	3.2
5.	Packaging.		2.9
	a.	Use proper storage.	3.3
	b.	Understand dating of cans.	2.8
	c.	Know use of boxing machine.	2.8
	d.	Know use of labeling machine.	2.6

TOBACCO FARMER

Other Titles: Tobacco Grower, Tobacco Producer.

Job Description:

A Tobacco Farmer is a person competent in both managerial and decision making skills and in the carrying out of the necessary technical improved (approved) practices which results in high yields of quality tobacco. Significant competencies are needed by both the owner-producer and the tenent-producer. Examples of the broad areas of work (competency areas) Tobacco Farmers perform are: planning to grow tobacco; producing a plentiful supply of sturdy, healthy plants; growing the tobacco, which includes fertilizing, preparing land, tillage practices, and controlling insects, diseases and suckers; harvesting, housing and curing the crop; and stripping and marketing.

Competencies Identified and Validated

	Weighted Means by Occupation**		
Competencies	Flue Cured N = 35	Burley N = 30	Dark Fired N = 30
1. Plan to grow tobacco.	3.0	2.9	3.2
a. Select a profitable variety of tobacco to grow.	3.7	3.5	3.6
b. Select land for tobacco.	3.6	3.6	3.8
c. Understand the importance of tobacco in the farm business.	2.9	2.7	2.8
d. Understand the supply and demand for tobacco.	2.5	2.5	2.9
e. Understand the importance of tobacco as a cash crop in the State.	2.5	2.4	2.8
2. Produce tobacco plants.	3.5	3.3	3.4
a. Control diseases in the tobacco plant bed.	3.9	3.6	3.7

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* Responses from Tobacco Farmers in South Carolina. Survey conducted by Department of Vocational Education, University of Kentucky, Lexington, Kentucky 40506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Competencies	Flue Cured Tobacco	Burley Tobacco	Dark Fired Tobacco
b. Understand the importance of having good tobacco plants.	3.8	3.6	3.6
c. Treat the tobacco plant bed for weed control.	3.8	3.5	3.7
d. Seed the tobacco plant bed.	3.8	3.6	3.6
e. Control insects in the tobacco plant bed.	3.8	3.6	3.6
f. Locate the tobacco plant bed in a good place.	3.6	3.7	3.5
g. Prepare the plant bed for seeding.	3.6	3.5	3.5
h. Fertilize the plant bed.	3.5	3.5	3.6
i. Check beds regularly.	3.5	3.2	3.6
j. Select proper cover.	3.5	2.9	3.2
k. Ditch tobacco beds.	3.3	2.8	3.3
l. Provide for tobacco plant bed next year.	3.1	2.8	3.1
m. Water tobacco beds.	3.0	3.5	3.1
n. Regulate the growth of tobacco plants in the bed by seeding date.	3.0	2.6	3.0
o. Water bed before pulling plants.	3.0	---	---
3. Grow tobacco.	3.5	3.2	3.0
a. Fertilize the tobacco crop.	3.8	3.7	3.7
b. Prepare land for tobacco.	3.8	3.4	3.7
c. Control insects in the tobacco field.	3.8	3.5	3.7
d. Transplant tobacco.	3.7	3.6	3.7
e. Control diseases in the tobacco field.	3.7	3.3	3.6
f. Apply chemicals for sucker control.	3.7	---	3.6
g. Top tobacco.	3.6	3.5	3.7
h. Sucker tobacco.	3.6	2.7	---
i. Treat for nematodes and wireworms.	3.5	---	---
j. Understand that a proper soil type is necessary to produce a good yield of high quality tobacco.	3.4	3.4	3.7
k. Cultivate tobacco.	3.4	3.2	3.5
l. Space plants in field.	3.4	3.1	3.6
m. Use soil tests.	3.1	3.1	3.2
n. Lime soil.	2.6	3.0	3.5
o. Utilize farm residues.	2.6	2.7	2.9
p. Understand that the nicotine content of tobacco depends, in part, upon weather and practices used while tobacco is in the field.	2.4	1.9	2.9

Competencies	Flue Cured Tobacco	Burley Tobacco	Dark Fired Tobacco
4. Harvest, house, and cure the crop.	3.3	2.8	3.3
a. Cure tobacco with heat.	3.8	3.0	3.7
b. House tobacco after curing.	3.8	3.2	3.4
c. Get curing barn ready for tobacco.	3.3	2.9	3.3
d. Cut stalks and turn up roots.	3.3	---	---
e. Understand the importance of ripe tobacco.	3.2	2.8	3.4
f. Space sticks on tier pole.	3.2	3.2	3.6
g. After harvest, seed tobacco land with small grain.	2.4	2.7	---
h. Cure tobacco with air.	---	3.0	---
i. Space plants on stick.	---	2.9	---
j. Sharpen and count tobacco sticks.	---	1.8	---
k. Use fans in barn.	---	1.8	---
5. Market tobacco (and store if necessary).	2.7	---	3.1
a. Bulk tobacco in a pack house when it cannot be placed on market.	3.3	---	3.3
b. Clean up pack house and storage room.	3.0	---	2.8
c. Go to market with tobacco.	2.6	---	3.4
d. Make grades in relation to market demands.	2.5	---	3.3
e. Is present when sold.	2.3	---	3.2
f. Prepare stripping room, clean, heat and lights.	---	---	3.1
g. Never hangs stripped tobacco in the barn.	---	---	2.8

TREE FRUIT GROWER

Other Titles: Tree Fruit Farmer, Tree Fruit Producer.

Job Description:

Select and develop sites, prepare site, select varieties, propagate and prune trees, plant trees, maintain soil and trees, and harvest and market fruit. Operate and maintain tillage and harvest equipment. Operate roadside markets. Work with management and labor personnel.

Competencies Identified and Validated

N = 28*

Competencies		Weighted Mean**
1.	Selection of variety.	2.8
a.	Select appropriate varieties of fruit trees for specific purposes.	3.2
b.	Select varieties of fruit trees adapted to the soil and climate of the area.	3.0
c.	Choose trees on root stocks adapted to the extremes of heat or cold of the area.	2.5
d.	Specify root stocks for the trees to be planted.	2.3
2.	Propagation.	2.4
a.	Make cleft grafts (top working).	2.5
b.	Select appropriate grafting materials (wood and tool).	2.5
c.	Bridge graft trees for mechanical and rodent repair.	2.4
d.	Bud seedling trees of appropriate kinds.	2.2
3.	Selection of site.	2.8
a.	Prepare the soil for planting fruit trees.	3.3
b.	Select sites which have air drainage and the areas where damage from frost is a limiting factor in production.	3.0
c.	Prepare the site for planting the trees.	3.0
d.	Select sites having adequate water drainage.	2.8
e.	Select sites having adequate water for irrigation.	2.5
f.	Add organic matter to the soil where needed.	2.5

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* Responses from 28 Fruit Growers in 9 states. Survey conducted by Department of Agribusiness and Natural Resources Education, Michigan State University, East Lansing, Michigan 48824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	g.	Test the soil of proposed sites for toxic salts.	2.2
4.	Field planting.		2.8
	a.	Plant trees in the orchard according to plan.	3.6
	b.	Water newly planted trees.	3.0
	c.	Lay out the orchard for greatest efficiency in production and maintenance.	2.9
	d.	Minimize erosion in newly planted orchard.	2.8
	e.	Mulch newly planted trees where the practice is recommended.	2.6
	f.	Use appropriate starter solutions on newly planted trees where recommended.	2.6
5.	Pruning.		2.9
	a.	Prune newly planted trees.	3.9
	b.	Prune trees to establish scaffold branches.	3.5
	c.	Select and use appropriate system of training for each kind of fruit.	3.2
	d.	Prune trees to remove dead and/or diseased branches.	2.9
	e.	Use limb spreaders to make stronger trees and cause earlier fruiting.	2.9
	f.	Prune trees for mechanical harvesting.	2.7
	g.	Prune trees to avoid parallel branches and/or cross branches occupying the same space.	2.6
	h.	Prune trees to encourage optimum color of fruit.	1.8
6.	Fertilization.		2.8
	a.	Take appropriate soil samples for nutrient and pH testing.	3.6
	b.	Specify fertilizer application for the site.	3.0
	c.	Apply a fertilizer to the soil via mechanical applicators (granules, liquid, gas).	3.0
	d.	Specify application of lime for the site.	2.9
	e.	Adjust fertilizer application to provide optimum quality of fruit.	2.8
	f.	Make foliar application of plant nutrients to orchard trees.	2.6
	g.	Prepare material for foliar feeding.	2.5
	h.	Take leaf samples for quantitative analysis by the Agricultural Experiment Station.	2.5
	i.	Apply fertilizer to trees via irrigation water.	2.2
7.	Irrigation.		2.5
	a.	Apply irrigation water according to specifications.	2.9
	b.	Make moisture tests of soil to determine need for irrigation.	2.6
	c.	Keep daily evaporation records to determine need for irrigation.	2.5

	d.	Develop a specified irrigation system under supervision.	2.4
	e.	Prepare soil to receive irrigation water.	2.3
8.		Disease and insect control.	3.1
	a.	Read and interpret the contents, directions for use, and cautions on the label of insecticides and fungicides.	3.6
	b.	Apply insecticides and fungicides to fruit trees as recommended using power equipment.	3.6
	c.	Select and wear protective clothing while working with fungicides and insecticides.	3.3
	d.	Keep systematic spray records.	3.3
	e.	Mix insecticides and fungicides for control of insects and diseases of fruit trees.	3.2
	f.	Protect wounds on trees.	3.0
	g.	Carry out an insect and disease control program by eliminating breeding and over-wintering places.	3.0
	h.	Control deer, rodents, birds, etc. that are pests in orchards.	3.0
	i.	Select disease resistant trees for planting.	2.7
	j.	Select disease resistant varieties where available.	2.6
	k.	Use attractants and/or traps to anticipate a rise in insect population.	2.4
9.		Harvesting.	2.8
	a.	Determine optimum time to harvest fruit crop.	3.3
	b.	Determine the most appropriate method of harvesting fruit.	3.0
	c.	Use handling machinery (forklifts, bulk bins, cooling platforms).	3.0
	d.	Sort harvested fruits into grades.	2.9
	e.	Operate grading and/or sorting machines.	2.6
	f.	Use harvesting aids (platforms, squirrels, etc.).	2.5
	g.	Harvest fruits grown in the area by appropriate methods.	2.3
10.		Pollination and fruit set.	2.8
	a.	Assure adequate pollination by use of bees where appropriate.	3.1
	b.	Assure pollination by the choice of varieties where appropriate.	3.1
	c.	Thin fruit by use of chemicals.	3.0
	d.	Thin fruit by hand.	2.9
	e.	Pollinate blossoms by bringing pollen to the trees to be pollinated.	2.0
11.		Management.	2.8
	a.	Keep accounts of fruit enterprises which will provide information needed for income tax reports.	3.1

b.	Determine the most economical sources of supply.	3.0
c.	Identify outlets for fruit products of the farm.	3.0
d.	Compare costs in relation to production with acceptable standards (labor costs per acre, production per acre, return per man, etc.).	2.9
e.	Adjust inputs (labor, machinery, fertilizer, chemicals, etc.) based on relative costs and anticipated returns.	2.9
f.	Determine production performance of each fruit enterprise in relation to acceptable standards.	2.8
g.	Keep accounts which will allow comparison of performance with farms reported by Cooperative Extension Service.	2.8
h.	Identify sources of supplies for fruit production.	2.8
i.	Determine outlets offering best returns for fruits from the farm.	2.8
j.	Use fruit farm management analyses to determine profitability of the business.	2.7
k.	Use farm management analyses of fruit farms to determine uses of credit.	2.6
l.	Adjust the fruit farming program based on reports from reliable sources.	2.5
m.	Use fruit farm management analyses to determine cash flow in the business.	2.5
n.	Use farm management analyses to determine appropriate credit terms.	2.4
12.	Labor management.	3.5
a.	Accept assignments of supervisor with enthusiasm.	3.6
b.	Complete tasks in an acceptable manner.	3.5
c.	Work constructively with fellow workers.	3.5
d.	See and anticipate next task which will contribute to the success of the enterprise.	3.5
e.	Stimulate fellow workers to perform tasks at optimum standard of workmanship.	3.4
13.	Marketing.	2.4
a.	Label varieties of fruit.	2.4
b.	Determine method of selling fruit crop.	2.7
c.	Select necessary equipment and supplies needed for specific roadside market facility.	2.7
d.	Display fruit for retail sale.	2.6
e.	Prepare fruit for the roadside market.	2.6
f.	Grade fruit to meet government standards for retail sale.	2.6
g.	Weigh or measure amount of fruit purchased by "pick-your-own" customers.	2.5

	h.	Suggest varieties of fruit to meet needs of the customer.	2.5
	i.	Package fruit for retail sale.	2.5
	j.	Maintain safe practices among customers for a "pick-your-own" marketing program.	2.5
	k.	Label varieties of fruit.	2.4
	l.	Meet customers in the farm market and to determine their needs and desires.	2.4
	m.	Plan a "pick-your-own" marketing scheme for tree fruits.	2.0
	n.	Plan access and exit for the roadside fruit market area.	2.0
	o.	Lay out driveways and parking space for a roadside market.	1.9
	p.	Plan the layout for a roadside fruit market.	1.8
14.	Farm power and equipment.		3.2
	a.	Operate the tractors and other power units commonly found on tree fruit farms of the area.	3.6
	b.	Identify diesel fueled and gasoline fueled internal combustion engines.	3.6
	c.	Operate equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area).	3.6
	d.	Lubricate, change oil and filters, and service air cleaners on the power units commonly found on the power units used on tree fruit farms of the area as specified in the operator's manual.	3.5
	e.	Check operation of the hydraulic systems on the area as specified in the operator's manual.	3.5
	f.	Maintain and service tires on machines commonly found on tree fruit farms of the area as specified in the operator's manual.	3.3
	g.	Adjust equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area).	3.3
	h.	Perform minor maintenance and service operations on the fuel system of the power units commonly found on the tree fruit farms of the area in accordance with the operator's manual.	3.2

i. Perform minor maintenance and service operations on the cooling systems of the power units commonly used on tree fruit farms of the area in accordance with the operator's manual. 3.2

j. Identify four-stroke cycle and two-stroke cycle engines. 3.1

k. Diagnose malfunctioning of equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area). 3.1

l. Perform maintenance operations on the hydraulic systems of machines commonly found on the tree fruit farms of the area as specified in the operator's manual. 3.1

m. Identify defective parts on equipment used on tree fruit farms (includes tillage, seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment commonly used in the area). 3.0

n. Diagnose malfunctioning of the power units commonly found on the tree fruit farms of the area. 3.0

o. Replace defective parts on equipment used on tree fruit farms of the area (includes tillage seeding, fertilizer and pesticide applicators, cultivation, harvesting, handling, storage, and processing equipment). 2.8

p. Locate equipment parts in the parts book. 2.5

VEGETABLE GROWER

Other Titles: Vegetable Farmer, Vegetable Farm Manager, Commercial Producer of Vegetables, Vegetable Gardener, Garden Farmer, Market Gardener, and Truck Farmer.

Job Description:

Raises vegetables. Determines kind and amount of crop to be grown, according to market conditions, weather, and size and location of farm. Select and purchase seed, fertilizer, and farm machinery and arrange with buyers for sale of crop. Hire and direct farm workers engaged in planting, cultivating, and harvesting crop, such as beets, beans, onions, peas, and potatoes. Performs various duties of farm workers, depending on size and nature of farm, including setting up and operating farm machinery.

Competencies Identified and Validated

N = 105*

Competencies	Weighted Mean**
1. Plan for growing vegetable crops.	3.2
a. Select varieties adapted to area and acceptable by market.	3.9
b. Select seeds or transplants of good quality.	3.8
c. Select sites suitable for vegetable crops.	3.8
d. Schedule plantings for orderly harvesting and marketing.	3.7
e. Schedule plantings at proper times for best success.	3.6
f. Know labor requirements of crops.	3.5
g. Understand the supply and demand for vegetables.	3.3
h. Understand the importance of vegetables in the farm business.	2.8
i. Understand the importance of vegetables as a cash crop and the state's agriculture.	2.6
j. Understand importance of vegetables as a food and in the diet.	2.2
k. Understand importance of vegetables as food.	2.2
2. Growing of vegetable crops.	3.5
a. Control insects using approved methods.	3.9
b. Control diseases using approved methods.	3.8

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* Responses from 105 Vegetable Growers in 6 states. Study conducted by Department of Vocational Education, University of Kentucky, Lexington, Kentucky 40506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

d.	Use effective seeding and transplanting techniques.	3.6
e.	Use soil tests to determine lime and fertilizer needs.	3.6
f.	Use suitable soil preparation.	3.6
g.	Use effective weed control methods including rotation, cultivation, and approved herbicides.	3.6
h.	Provide adequate soil water by irrigation when needed.	3.4
i.	Use special cultural techniques for individual crop.	
	(1) Stake vegetable crops (tomatoes, cucumbers, pole beans).	3.0
	(2) Prune tomatoes.	2.8
	(3) Blanch cauliflower.	2.7
3.	Harvest, grade, process, store, and market vegetable crops.	3.4
a.	Harvest crops at proper stage.	3.8
b.	Market vegetables.	3.7
c.	Harvest at proper time for each crop.	3.6
d.	Harvest with minimum damage to crop.	3.6
e.	Grade and sort vegetables.	3.3
f.	Store vegetables properly.	3.2
g.	Wash and cool vegetables where appropriate.	3.2
h.	Package vegetables.	3.1

AGRICULTURAL SUPPLIES AND SERVICES

Thousands of persons in the United States are engaged in agricultural supplies and services occupations which are very essential to American agriculture. Many of these occupations have only recently emerged on the agricultural scene in this country. Those occupations surveyed in this National Study are described on the following pages.

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CHEMICAL APPLICATOR

Other Titles: Agricultural Technician, Biological Technician, Gardener, Groundskeeper, Farm Worker, Equipment Operator, Chemical Equipment Salesperson.

Job Description:

Provides information to others for the purpose of selecting chemicals and application equipment; applies chemicals to agricultural and ornamental crops; repairs and maintains equipment for applying agricultural chemicals; uses accepted business procedures for keeping records; practices accepted human relations with work-related personal contacts.

Competencies Identified and Validated

N = 36*

Competencies	Weighted Mean**
1. Describe chemical characteristics.	3.0
a. Read and interpret package labels and other guidelines for safety: clothing, environment, symptoms of contamination, and antidotes.	4.0
b. Read and interpret package labels: rates, schedule, method and cost of application, residuals, and expected performance.	3.9
c. Recommend kinds of pesticides and rates to be used in specific situations based upon environmental, economic, and performance considerations.	3.0
d. Name businesses and agencies, both private and public, available for analysis and/or consultation on chemicals and pests.	2.8
e. Identify insects and other pests that are economically controlled by chemicals.	2.7
f. Determine storage hazards of chemicals.	2.7
(1) Describe effects of moisture, temperature, and pressure on chemicals.	
(2) Describe reasons certain chemicals should not be stored together or in certain locations.	

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* Responses from 36 Chemical Applicators in 14 states. Survey conducted by Department of Agricultural Education, Clemson University, Clemson, South Carolina 29631.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

g.	Describe compatibility of equipment and chemicals.	2.6
(1)	Identify chemical characteristics affecting compatibility: petroleum vs. water base, soluble vs. suspension, and abrasive vs. non-abrasive.	
(2)	Describe characteristics of equipment which affect compatibility with chemicals.	
h.	Recommend best and alternative chemicals.	2.3
2.	Describe equipment characteristics.	2.8
a.	Describe protective equipment needed to handle agricultural chemicals (protection of humans, facilities, equipment, and animals).	3.9
b.	Describe protective clothing to avoid contamination of body tissues.	3.8
c.	Describe places and methods of storage.	3.2
d.	Describe general characteristics of hand and ground sprayers.	3.1
e.	Recognize and describe equipment parts and maintenance requirements for: hoses, filters, pumps, pressure gauges, pressure regulators, tanks, nozzles, agitators, and cut-off and diverter valves.	3.0
f.	Describe general characteristics of multi-purpose sprayers: tractor mounted, self-propelled, and wheel-mounted drawn.	2.9
g.	Describe features affecting compatability of equipment and chemicals.	2.8
h.	Describe specific uses of various nozzles: flat fan, even fan, flooding, boomless, off-center, solid cone, hollow cone, and whirl chamber.	2.8
i.	Describe equipment required for safe disposal of chemicals and containers.	2.7
j.	Describe capabilities of granular and dust equipment.	2.5
(1)	Dust - air and fan; electronic charged.	
(2)	Granular - gravity-feed; force-feed.	
k.	Describe general capabilities of fumigator equipment.	2.3
(1)	Low-volatility liquid (gravity-forced pressure).	
(2)	Gas type.	
l.	Describe characteristics of general-use sprayers.	1.9

m. Describe general features and characteristics of specialized equipment such as: 1.8

  (1) High pressure sprayers.
  (2) Air-blast sprayers.
  (3) Low-volume "mist blowers".
  (4) Ultra-low volume sprayers (hydraulic driven fans) at distribution points.

3. Know how to apply chemicals. 2.9

  a. Follow accepted procedures in accident situations (emergency telephone numbers, physicians' names, first-aid centers, and procedures). 3.9
  b. Recognize pesticide poisoning symptoms. 3.7
  c. Warn persons prior to applications of hazardous chemicals - without undue alarm. 3.3
  d. Calculate pesticide quantity to be applied to a given area. 3.3
  e. Recognize symptoms of pesticide damage or residues due to chemical selection or application errors (burns, slowed growth, leaf-drop, etc.). 3.3
  f. Use human and wildlife safety measures. 3.2

    (1) Avoid hazardous environmental conditions (winds, heat, volatile materials, threatening rains). 3.3

    (2) Add chemicals to tanks, using approved techniques and materials (funnels, hoses, check valves, etc.). 3.2

    (3) Read and obey safety precautions on equipment and packages. 3.2

    (4) Use protective clothing (gloves, goggles, masks, rubber apparel). 3.2

  g. Calculate pesticide and/or custom application bills. 3.2
  h. Select chemicals for specific problems. 3.2

    (1) Observe specific warnings and first-aid measures. 3.5

    (2) Determine safety guidelines and capabilities of the applicator. 3.6

    (3) Match chemicals with available protective equipment. 3.4

    (4) Match concentration and specific job. 3.4

(5) Calculate pesticide volume required.	3.4
(6) Match chemicals to conditions.	3.3
(7) Determine capability of available equipment.	3.3
(8) Assess compatibility of selected chemicals.	3.1
(9) Select mixing methods.	2.8
(10) Dispose of used containers.	2.8
i. Select time of application.	3.1
(1) Identify current legal and moral restrictions on use.	3.3
(2) Select application pattern (broadcast, directed spray, band treatment, post or pre-emerge).	3.2
(3) Match rate of application with plant condition, pest population, environment, etc.	3.2
(4) Identify harvest-delay and/or reentry-delay requirements for specific chemicals and treatments.	2.8
j. Inspect respirators for cleanliness, effectiveness, and proper fit.	2.9
k. Recognize capabilities of hand sprayers (air pumps, CO_2 and compressed air).	2.8
l. Select and match nozzles for equipment type, chemical used, and pattern of application.	2.8
m. Select surfactants or wetting agents for specific situations.	2.8
n. Select and/or supervise storage procedures.	2.7
(1) Select storage facilities for factors of moisture, temperature, etc.	2.8
(2) Determine safe storage distances of various chemicals.	2.6
o. Calculate coverage.	2.7
(1) Use calibration charts prior to equipment adjustment for coverage.	3.1
(2) Determine critical distances: row-space, boom or coverage width, distance traveled (tape, pacing, etc.).	2.7
(3) Read and interpret rate charts such as "pint jar" or "1/128 Acre" methods.	2.3

p. Determine compatibility of equipment and chemicals. 2.6
    (1) Identify chemical characteristics affecting compatibility. 2.6
    (2) Identify equipment characteristics which affect compatibility. 2.7
q. Recognize and describe symptoms of common pests as follows: 2.6
    (1) Symptoms of insects and nematodes (chewing, mining, sucking: holes, wilting, discoloration, etc.). 2.8
    (2) Symptoms of fungi and bacteria. 2.4
r. Recognize common pests such as: 2.6
    (1) Insects of plants and animal enterprises and homesteads. 2.9
    (2) Weeds of row crops, pastures, ponds, forests. 2.5
    (3) Fungi and bacteria of plant and animal enterprises and homesteads. 2.4
s. Select nozzles and adjust pressure for various pesticide applications. (Flat fan @ 30 psi; solid cone @ 60 psi, etc.). 2.4
t. Supervise and/or perform the mixing of chemicals and carrying agents. 2.4
u. Determine the discharge rate of the following equipment: 2.3
    (1) Nozzle capacity. 3.2
    (2) Area covered. 2.7
    (3) Nozzle pressure. 2.4
    (4) Ground speed of applicator. 2.3
    (5) For air blast equipment, air velocity. 0.8
v. Recognize differing features of various ground sprayers. 2.3

4. Adjust and care for equipment. 2.6
    a. Check application equipment for leaks, clogs, improper equipment, and/or other malfunctions. 3.4
    b. Add chemicals to tanks and hoppers using funnels, hoses, check valves, etc. 3.2
    c. Adjust equipment as follows: 2.9
        (1) Maintain consistent and appropriate speeds. 3.0

(2) Set correct pressures. 3.0

(3) Adjust equipment height and width to achieve desired distribution pattern. 2.9

(4) Adjust mixing apparatus. 2.8

d. Check personal protection equipment such as: 2.7

(1) Check respirators for fit, effectiveness, and proper fit. 2.9

(2) Check gloves, goggles, and other protective clothing. 2.6

e. Replace and/or repair nozzles, hoses, cut-off valves, etc. 2.7

f. Prepare equipment for storage as follows: 2.4

(1) Drain systems prior to storage. 2.6

(2) Flush systems of residues. 2.4

(3) Remove residues of dusts and granules from hoppers, deflectors, fans, etc. 2.1

g. Repair sprayer pumps (rotors, pistons, rollers, seals). 2.3

5. Repair and maintain equipment. 2.5

a. Supervise and/or perform maintenance and repairs. 2.9

(1) Follow operator's manual for adjustments. 3.4

(2) Lubricate according to manuals. 3.0

(3) Repair and/or maintain sprayers. 3.0
(a) Main delivery lines (hoses, clamps, valves, pipes).
(b) Pumps.
(c) Agitators.
(d) Nozzles.
(e) Strainers.
(f) Pressure regulators.
(g) Tanks (flush, clean, patch, replace).
(h) Frame (clean, repair, modify).

(4) Repair and/or maintain dusters. 2.6

(a) Pulleys and belts.
(b) Hoppers.
(c) Distribution lines.
(d) Fans.
(e) Frames.

(5)	Repair and/or maintain fumigators (including ammonia rigs).	2.4
(a)	Hoses and pipes (inspects, flushes, replaces).	
(b)	Tanks (inspects, flushes, repairs, replaces).	
(c)	Injectors (inspects, flushes, repairs, replaces).	
b.	Supervise and/or use supporting equipment and tools as follows:	2.4
(1)	Grease guns.	3.1
(2)	Trucks - motor vehicle.	3.1
(3)	Steel tapes and other rulers (linear scales).	3.1
(4)	Wrenches (box, open end, socket, adjustable, etc.).	3.0
(5)	Screwdriver.	3.0
(6)	Pliers.	3.0
(7)	Grind wheels and wire brushes.	3.0
(8)	Bearing and gear pullers.	2.9
(9)	Bearing and seal presses.	2.9
(10)	Air tanks, hoses, and accessories.	2.9
(11)	Fire extinguisher.	2.9
(12)	Billing equipment (manual and/or machine).	2.7
(13)	Oil cans.	2.7
(14)	Tractors - garden and/or utility.	2.4
(15)	Weight scales (balance, spring).	2.4
(16)	Electric soldering iron.	2.3
(17)	Jacks - hydraulic, screw, and mechanical.	2.3
(18)	Steam cleaners.	2.2
(19)	Cash registers.	2.2
(20)	Electric arc welders.	2.1
(21)	Air wrench.	2.1
(22)	Soil augers.	2.1
(23)	Paint sprayers and paint brushes.	2.1
(24)	Electric hand drills and drill presses.	2.0
(25)	Solvents (alcohol or petroleum distillates).	2.0

(26)	Power and hand operated hacksaws.	1.9
(27)	Fork lifts (manual or power).	1.9
(28)	Hammers and/or hand saws.	1.8
(29)	Pipe dies and reamers.	1.8
(30)	Ammonia solutions.	1.8
(31)	Two-way radios.	1.8
(32)	Steel squares.	1.8
(33)	Oxyacetyline welders.	1.7
(34)	Hand trucks (bag).	1.7
(35)	Containers (plastic, metal, cardboard, fiberglass, etc.).	1.6
6.	Use business procedures and human relations.	2.9
a.	Use these personality traits on the job.	3.5
(1)	Honest.	4.0
(2)	Careful.	3.8
(3)	Dependable.	3.8
(4)	Cooperative.	3.7
(5)	Accurate.	3.6
(6)	Conscientious.	3.6
(7)	Responsible.	3.6
(8)	Mature.	3.5
(9)	Alert.	3.4
(10)	Confidence.	3.4
(11)	Enthusiastic.	3.4
(12)	Efficient.	3.4
(13)	Loyal.	3.3
(14)	Patient.	3.3
(15)	Energetic.	3.3
(16)	Kind.	3.3
(17)	Agreeable.	3.2
(18)	Appreciative.	3.2
(19)	Tactful.	3.1
(20)	Tolerant.	3.1
(21)	Realistic.	2.5

- b. Maintain sales records. 3.0
    - (1) File and/or post forms for orders or deliveries of products and services. 3.4
    - (2) Properly complete charge and cash billing forms for warehouse, retail, or wholesale orders. 3.2
    - (3) Receive cash, checks, or purchase orders for supplies and services. 3.0
    - (4) Prepare sales tickets. 2.2
        - (a) Calculate charges (amounts for various services provided to customers).
        - (b) Calculate discounts and sales tax, extend unit prices, etc.
- c. Practice accepted human relations techniques and show personality traits. 2.8
    - (1) Take instructions or directions from:
        - (a) Employers (use of written and mental notes).
        - (b) Fellow employees.
        - (c) Customers.
    - (2) Relay verbal and written messages to: 3.2
        - (a) Employers.
        - (b) Fellow employees.
        - (c) Customers.
        - (d) Other business contacts such as suppliers.
    - (3) Properly greet: 2.8
        - (a) Fellow employees.
        - (b) Employers.
        - (c) Customers.
        - (d) Other business contacts.
    - (4) Recognize the basic human needs which play a part in worker motivation (e.g., life sustenance, physical safety, respect, esteem, self-realization, and actualization). 1.7
- d. Manage business resources. 2.8
    - (1) Relay and/or receive job instruction. 3.9
    - (2) Use radio, telephone, and other communications systems. 3.1

	(3)	Formulate daily objectives, (jointly and/or independently) for organization and delegation/distribution of manpower, equipment, facilities, and goods.	3.0
	(4)	Develop awareness of management and ownership responsibilities and general risks and rewards of business operations.	2.8
	(5)	Use basic business machines for mathematical calculations.	2.6
	(6)	Monitor capital flow, accounts payable, and accounts receivable.	2.4
	(7)	Practice inter-departmental (section) coordination of capital, materials, equipment, facilities, processes, functions, and manpower.	2.4
	(8)	Follow accepted procedures for credit investigation and/or applications prior to delivery of materials.	2.3
e.	Maintain quanity and quality inventory.		2.6
	(1)	Maintain security of merchandise, equipment.	3.1
	(2)	Maintain freight records and verify bill of laden with merchandise receipt and condition.	2.9
	(3)	Order, reorder, and receive merchandise.	2.7
	(4)	Use inventory forms to maintain adequate quantities and varieties of supplies.	2.7
	(5)	Keep suitable stock on display in an acceptable arrangement.	2.5
	(6)	Maintain housekeeping standards by directing other employees.	2.3
	(7)	Perform or supervise housekeeping chores or stock arrangement, dust and debris control, and other "image-forming" activities.	2.2

AGRI-CHEMICAL OCCUPATIONS

AGRI-CHEMICALS MANAGER

Other Titles: Plant Manager, Area Supervisor, Office Manager, Sales Manager, Retail Unit Manager, Plant Superintendent, Lead Operator, Store Manager.

Job Description:

The Manager is responsible for implementing and enforcing policies which will maximize profitability and efficiency for the local retail outlet, through effective sales, maintenance, safety, and distribution programs; hires and dismisses employees; orders and maintains adequate amounts of product; and is ultimately responsible for equipment purchases and repairs. Usually under the supervision of the Regional Sales Representative (or similar title).

AGRI-CHEMICALS FIELD TECHNICIAN

Other Titles: Assistant Manager, Soil and Crop Specialist, Senior Serviceman.

Job Description:

The Field Technician is required to be competent in all operations of the local retail outlet so that they may temporarily substitute for the Manager in all aspects of that job except for major financial matters such as purchasing equipment or product and hiring and dismissing employees.

AGRI-CHEMICALS SERVICE MECHANIC

Other Titles: Service Person, Chief Mechanic, Equipment Manager, Maintenance Supervisor.

Job Description:

The Service Mechanic is responsible for a constant awareness of physical condition of all equipment needed to effectively operate the local retail outlet. This includes being able to operate all blending, handling, application, transferring, and storing equipment; assemble and maintain all such equipment.

Competencies Identified and Validated

Competencies		Weighted Means by Occupation**		
		Manager N = 23 *	Field Technician N=20*	Service Mechanic N = 13*
1.	Learn safety rules.	3.4	2.8	2.7
a.	Read and obey safety precaution provided on equipment and on packages.	3.8	3.6	3.2
b.	Follow an accepted procedure in case of an accident (emergency telephone numbers, first aid center, etc.).	3.8	3.1	3.2
c.	Be familiar with information regarding laws and regulations governing the use of chemicals.	3.7	3.0	3.8
d.	Determine where and how to store the chemical.	3.7	2.8	2.2
e.	Eliminate or minimize safety hazards by instructing employees and customers in safe working procedures.	3.6	3.1	2.5
f.	Determine equipment needs for safe disposal of the chemical container.	3.5	2.6	2.5
g.	Pass state "Pesticide Safety Licensing".	3.4	3.0	1.7
h.	Have knowledge of weight limits and special machinery.	3.3	2.3	3.2
i.	Prepare proper proportions of chemical and carrying agents.	3.1	2.8	2.0
j.	Place in hospital the books on chemical ingredients and treatment or antidote for poisoning.	3.0	2.2	1.3
k.	Select and check respirators for cleanliness, effectiveness, and proper fit.	3.0	2.2	3.0

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* Responses from persons employed in the Agri-Chemical Occupations in five north central states. Survey conducted by Agricultural Education Section, Purdue University, West Lafayette, Indiana 47907.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Competencies	Manager	Field Technician	Service Mechanic
1. Check application equipment for leaks, clogged lines, and improper nozzles and/or other malfunctions.	3.0	3.2	3.5
2. Know soil science relationships.	3.0	3.0	1.6
a. Recognize weeds in row crops, pastures, forests, and ponds.	3.4	3.3	2.1
b. Formulate herbicide-fertilizer mixtures.	3.4	2.7	1.5
c. Identify soil deficiencies from symptoms of growing plants.	3.0	2.8	1.6
d. Recommend treatment to adjust pH to appropriate levels.	3.0	3.1	1.1
e. Explain the function of various chemical elements in plant growth.	2.9	2.8	1.7
f. Determine which surfactants or wetting agents may be best for specific applications.	2.9	2.9	1.6
g. Take soil samples for chemical analysis.	2.7	3.2	1.8
3. Understand merchandising products and services.	3.2	2.9	1.6
a. Recognize a farmer's potential as a producer.	3.7	3.2	1.5
b. Determine relative amounts of different kinds and types of chemicals to be applied per acre.	3.6	3.3	2.5
c. Calculate the pesticide and/or application bill for a customer.	3.4	2.8	1.1
d. Compute costs and returns in determining the use of agricultural chemicals.	3.4	2.9	1.5
e. Compute amounts of active ingredients of chemicals to be used.	3.4	3.2	1.9
f. Receive money, prepare necessary records to provide receipts for customers, and provide control.	3.2	3.0	1.6

Competencies	Manager	Field Technician	Service Mechanic
g. Maintain suitable stock inventories and arrangement.	3.2	2.0	1.8
h. Name private and public laboratories and agencies available for analysis and/or consultations.	3.0	2.4	0.9
i. Maintain security of files, merchandise, and equipment.	3.0	3.6	1.6
j. Have a working knowledge of chemical manufacturing.	2.7	2.5	1.5
k. Conduct field trials on new chemicals, and determine profitability and effectiveness.	2.6	2.9	1.6
4. Be able to calibrate equipment.	3.1	3.1	3.1
a. Read and interpret package labels, rate of application, and other methods.	3.5	3.5	2.9
b. Calibrate volume, pressure, and output of equipment.	3.1	3.5	3.4
c. Plan alternative methods of chemical applications.	3.1	3.0	2.2
d. Adjust mixing apparatus to maintain proper solution quality.	3.1	3.1	3.3
e. Describe appropriate applications of various nozzles: flat fan, even fan, flooding, boomless, off center, solid cone, hollow cone, and whirl chamber.	3.0	3.4	3.5
f. Adjust height and width to achieve desired distribution patterns.	3.0	3.1	3.4
g. Use calibration charts to set up the sprayer for adequate coverage.	3.0	3.2	3.2
h. Follow operator's manual for adjustments.	2.9	3.0	3.5
i. Weigh and measure small quanitities of chemicals.	2.9	3.0	2.8

Competencies	Manager	Field Technician	Service Mechanic
5. Know pest control procedures.	3.2	3.1	2.0
a. Recognize symptoms of pesticide damage and residues due to error of application or selection of pesticides.	3.5	3.4	2.2
b. Identify fungi and bacteria on plants and animals and their symptoms.	3.4	3.5	2.4
c. Consider together, the pest, the hose being attached, and the approved chemicals available, then recommend to the customer the most efficient method, considering environment and control.	3.4	3.3	2.2
d. Recognize symptoms of insects and nematodes (chewing, sucking, and biting).	3.2	3.3	2.2
e. Calculate the "economic injury level" for the customer.	3.2	2.9	1.6
f. Identify common insects, weeds, diseases, and other pests and their damage common to the area.	3.1	3.1	2.3
g. Recommend treatment for animals and poultry suffering from parasites.	2.9	2.4	0.9
6. Purchase, maintain, and repair equipment.	2.3	2.5	3.3
a. Protect company against liability claims by adequate insurance policies.	3.4	2.7	2.2
b. Call on customers in the slack season to develop sales for the retail outlet.	3.3	3.1	2.3
c. Inspect all operating equipment according to established procedures and recommend repairs as needed.	3.3	2.6	3.7
d. Describe characteristics of equipment which affect compatability with chemicals.	3.0	2.8	3.5

Competencies	Manager	Field Technician	Service Mechanic
e. Use appropriate service equipment and tools needed to maintain or assemble new equipment.	2.9	2.6	3.6
f. Deliver liquid or dry material to customer operating custom applicating equipment where necessary.	2.9	2.6	2.4

AGRI-CHEMICAL OCCUPATIONS

AGRI-CHEMICALS WAREHOUSE MAN

Other Titles: Assistant Plant Manager, Serviceman, Chemical Warehouseman.

Job Description:

The Warehouseman is responsible for maintaining an accurate inventory at all times; storing compatible chemicals in proper temperature of facility at all times; possess a working knowledge of chemicals' reactivity, volatility, and stability levels; providing for an appealing display area and arrangement; operating and maintaining storage, handling, and transfer of equipment. Usually under the supervision of the Manager and Assistant Manager.

AGRI-CHEMICALS TROUBLE SHOOTER

Other Titles: Assistant Sales Manager, Assistant Sales Representative, Scout.

Job Description:

The Trouble Shooter is responsible for promotion and sale of product and services within assigned area; soil sampling, crop inspection, pesticide performance evaluation, and yield prediction; handling complaints, comments, and suggestions of customers relative to products and services of retail outlets. Usually supervised by Manager.

AGRI-CHEMICALS SALES CLERK

Other Titles: Office Clerk, Store Clerk, Clerk-Typist, Bookkeeper.

Job Description:

The Sales Clerk must be able to: prepare and receive orders from customers; prepare customer invoices; operate weighing equipment; receive money and maintain necessary inventory and financial records; prepare statistical reports for forecast purposes; operate and maintain all office equipment; make recommendations to customers on a limited basis. Sales Clerks are responsible to the Manager.

Competencies Identified and Validated

Competencies	Warehouse Man N = 15*	Trouble Shooter N = 16*	Sales Clerk N = 21*
	Weighted Means by Occupation**		
1. Learn safety rules.	3.2	2.9	2.7
a. Determine where and how to store the chemical.	3.8	3.1	2.5
b. Follow an accepted procedure in case of an accident (emergency telephone numbers, first aid center, etc.).	3.8	3.2	3.2
c. Determine equipment needs for safe disposal of the chemical containers.	3.7	2.7	2.5
d. Read and obey safety precautions provided on equipment and on packages.	3.7	3.5	3.3
e. Eliminate or minimize safety hazards by instructing employees and customers in safe working procedures.	3.7	3.3	3.3
f. Select and check respirators for cleanliness, effectiveness, and proper fit.	3.4	2.2	2.6
g. Pass state "Pesticide Safety Licensing".	3.3	3.3	3.0
h. Be familiar with information regarding laws and regulations governing the use of agrichemicals.	3.3	3.1	3.3
i. Have knowledge of weight limits and special machinery.	2.7	2.8	2.6
j. Prepare proper proportions of chemical and carrying agents.	2.6	3.0	2.5

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* Responses from persons employed in the Agri-Chemical Occupations in five north central states. Survey conducted by Agricultural Education Section, Purdue University, West Lafayette, Indiana 47907.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Competencies	Warehouse Man	Trouble Shooter	Sales Clerk
k. Check application equipment for leaks, clogged lines, and improper nozzles and/or other malfunctions.	2.3	2.9	2.4
l. Place in hospitals the books on chemical ingredients and treatment or antidote for poisoning.	1.7	2.1	1.8
2. Know soil science relationships.	2.2	2.7	2.5
a. Formulate herbicide-fertilizer mixtures.	3.7	2.4	3.0
b. Take soil samples for chemical analysis.	2.7	2.7	2.6
c. Determine which surfactants or wetting agents may be best for specific application.	2.0	2.7	2.2
d. Recognize weeds in row crops, pastures, forests, and ponds.	1.9	2.9	3.0
e. Identify soil deficiencies symptoms of growing plants.	1.8	2.9	2.3
f. Recommend treatment to adjust pH to appropriate levels.	1.6	2.7	2.2
g. Explain the function of various chemical elements in plant growth.	1.5	2.5	2.4
3. Understand merchandising production and services.	2.2	2.3	2.5
a. Maintain suitable stock inventories and arrangement.	3.6	1.8	2.6
b. Maintain security of files, merchandise, and equipment.	2.7	1.8	3.6
c. Recognize a farmer's potential as a producer.	2.6	2.9	2.5
d. Calculate the pesticide and/or application bill for a customer.	2.4	2.7	2.4
e. Determine relative amounts of different kinds and types of chemicals to be applied per acre.	2.2	2.7	3.5

Competencies	Warehouse Man	Trouble Shooter	Sales Clerk
f. Receive money, prepare necessary records to provide receipts for customers, and provide control.	2.1	2.0	3.7
g. Name private and public laboratories and agencies available for analysis and/or consultations.	2.0	2.0	1.8
h. Compute amounts of active ingredients of chemicals to be used.	1.9	2.7	2.7
i. Compute costs and returns in determining the use of agricultural chemicals.	1.8	2.7	2.7
j. Have a working knowledge of chemical manufacturing.	1.6	1.9	2.4
k. Conduct field trials on new chemicals and determine profitability and effectiveness.		2.3	1.7
4. Be able to calibrate equipment.	2.3	3.0	2.6
a. Read and interpret package labels: rate of application, time of application, and alternative methods.	2.9	3.3	3.7
b. Follow operator's manual for adjustments.	2.7	3.1	2.6
c. Calibrate volume, pressure, and output of equipment.	2.5	3.4	2.7
d. Use calibration charts to set up the sprayer for adequate coverage.	2.3	3.5	2.3
e. Plan alternative methods of chemical application.	2.2	3.5	2.3
f. Weigh and measure small quantities of chemicals.	2.1	2.5	2.4
g. Adjust mixing apparatus to maintain proper solution quality.	2.1	2.6	2.0
h. Adjust height and width to achieve desired distribution patterns.	1.7	2.5	2.1

Competencies	Warehouse Man	Trouble Shooter	Sales Clerk
i. Describe appropriate applications of various nozzles: flat fan, even fan, flooding, boomless, off-center, solid cone, hollow cone, and whirl chamber.	1.7	3.1	2.4
5. Know pest control procedures.	1.9	3.1	2.8
a. Recognize symptoms of pesticide damages and residues due to error of application or selection of pesticides.	2.4	3.5	3.0
b. Identify fungi and bacteria on plants and animals and their symptoms.	2.2	3.4	3.0
c. Consider together, the pest, the hose being attached, and the approved chemicals available, then recommend to the customer the most efficient method, considering environment and control.	2.1	3.4	3.2
d. Recognize symptoms of insects and nematodes (chewing, sucking, and biting).	1.9	3.3	2.8
e. Identify common insects, weeds, diseases, and other pests and their damage common to the area.	1.7	3.2	2.6
f. Recommend treatment for animals and poultry suffering from parasites.	1.7	1.7	2.1
g. Calculate the "economic injury level" for the customer.	1.5	2.8	2.8
6. Purchase, maintain, and repair equipment.	2.3	2.5	2.1
a. Use appropriate service equipment and tools needed to maintain or assemble new equipment.	2.6	2.9	1.8
b. Deliver liquid or dry material to customer operating custom applicating equipment where necessary.	2.5	2.5	2.1

Competencies	Warehouse Man	Trouble Shooter	Sales Clerk
c. Follow greasing and oiling instruction of operator's manual using grease guns and oil cans, packing bearings, etc.	2.5	2.7	2.1
d. Describe characteristics of equipment which affect compatability with chemicals.	2.4	2.5	2.5
e. Inspect all operating equipment according to established procedures and recommend repairs as needed.	2.3	2.7	1.7
f. Repair and maintain sprayer parts, fumigators, and equipment.	1.9	2.5	2.8
g. Repair and/or maintain dusters.	1.7	1.7	1.6
7. Develop managerial abilities.	1.7	2.4	2.8
a. Handle customer complaints within limits established through company channels.	2.8	2.8	3.4
b. Council and advise farmers to assist in increasing their profitability.	2.3	2.7	3.5
c. Call on customers in the slack season to develop sales for the retail outlet.	1.9	2.5	2.6
d. Evaluate and report competitive pricing policies and activities within the area and recommend corrective action.	1.8	2.7	2.3
e. Implement and administer company approved credit and collection policies.	1.2	2.1	3.1
f. Formulate an advertising campaign to promote sale of an agri-chemical product on a broad basis.	0.9	1.9	2.6
g. Protect company against liability claims by adequate insurance policies.	0.9	2.1	2.4

ANIMAL TECHNICIAN

Other Titles: Animal Health Technician, Veterinary Assistant.

Job Description:

An Animal Technician is a person knowledgeable in the care and handling of animals, and the basic principles of normal and abnormal life processes, and in routine laboratory and animal health care procedures. He or she is primarily an assistant to veterinarians, biological research workers, and other scientists. Examples of the type of work animal technicians perform are:

1. Veterinary Assistant
    a. Companion Animal Practice (dogs, cats, pets).
    b. Meat Animal Practice (beef, swine, sheep, etc.).
    c. Mixed Practice (a and b above).
2. City, State, and Federal Animal Health Agencies
3. Research and development for government and private industry.

Competencies Identified and Validated

N = 52*

Competencies		Weighted Mean**
1.	Radiology.	3.6
a.	Be able to properly develop radiographic films using manual and/or automatic methods.	3.9
b.	Load and unload cassettes.	3.9
c.	Take proper care of developing solutions and film.	3.8
d.	Understand anatomy in order to properly position small and large animals for radiographic procedures.	3.6
e.	Be able to operate various x-ray machines, setting up effective technique charts.	3.4
f.	Guard against unnecessary radiation.	3.4
g.	Be able to administer contrast agents in the proper amount and correct routes.	3.1
h.	Know how to use different types of contrast medias.	2.9

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* Responses from 52 Animal Technicians throughout the United States. Survey conducted by the Veterinary Technology Department, University of Nebraska School of Technical Agriculture, Curtis, Nebraska 69025.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.	Restraint.	3.7
a.	Be able to restrain all types of domestic animals (large and small).	3.8
b.	Be able to use different restraint equipment.	3.7
c.	Be able to determine proper type and amount of restraint for a given situation.	3.5
3.	Animal science and production.	3.2
a.	Have rapport with the animal patients and be able to handle them for treatment, etc.	3.8
b.	Apply good husbandry practices in handling animals.	3.5
c.	Feed animals with a minimum of supervision (correct diet, etc.).	3.4
d.	Identify the different breeds of animals.	3.2
4.	Sanitation and animal housing management.	3.3
a.	Be able to apply sound sanitation principles in the upkeep of a veterinary clinic or hospital.	3.3
b.	Handle and give nursing care for the different species of animals.	3.5
c.	Keep syringes and other equipment ready for use.	3.5
d.	Be able to perform different types of sterilization.	3.4
e.	Supervise and take care of the kennel and/or large animal holding facilities.	3.4
f.	Be able to give proper nursing care to all animals, (bandaging and treatment).	3.3
g.	Cheerfully do the necessary menial jobs.	3.3
h.	Be able to use different disinfectants.	3.0
5.	Animal nutrition.	2.2
a.	Understand the fundamental principles of animal nutrition, digestion and utilization of feed.	2.6
b.	Balance rations for large and small animals using TDN, Pearson Square, and Net Energy methods.	1.8
6.	Written and oral communications.	3.3
a.	Talk to clients over the phone satisfactorily.	3.9
b.	Talk to clients in the hospital or clinic.	3.9
c.	Talk on the 2-way radio satisfactorily.	2.7
d.	Write satisfactory business correspondence.	2.7
7.	Veterinary orientation.	3.3
a.	Understand procedures for handling rabies suspects and specimens.	3.8

	b.	Be able to converse adequately with clients.	3.8
	c.	Understands his/her role in veterinary medicine.	3.7
	d.	Take down adequate case histories.	3.7
	e.	Take temps, pulse, and respiration.	3.7
	f.	Be able to fill out health certificates.	3.1
	g.	Properly administer an enema.	3.0
	h.	Intelligently assist in tests for breeding soundness.	2.8
	i.	Be able to fill out Brucellosis test and vaccination forms.	2.8
	j.	Be able to fill out TB test forms.	2.5
8.		Equipment and instruments.	2.7
	a.	Identify surgical instruments.	3.6
	b.	Identify and have a knowledge of large animal equipment and instruments.	3.0
	c.	Set up and operate an electronic tooth scaler.	2.5
	d.	Be able to properly care for and stock an ambulatory vehicle.	2.5
	e.	Operate an E.C.G. machine.	1.8
9.		Anesthesiology.	3.5
	a.	Exercise proper care of anesthetized patients.	3.9
	b.	Be able to monitor the patient's vital signs and depth of anesthesia.	3.7
	c.	Be familiar with emergency procedures and drugs.	3.6
	d.	Be able to operate and care for the different types of anesthetic machines including respirators.	3.2
	e.	Be able to administer all forms of anesthetics for local, regional, and general anesthesia in all species of domestic animals.	3.2
10.		Surgical preparation.	3.7
	a.	Prepare the operating room.	3.8
	b.	Prepare an animal for surgery.	3.8
	c.	Prepare a surgical pack and sterilize it.	3.8
	d.	Prepare himself to be an aseptic assistant for surgery.	3.7
	e.	Be able to identify surgical instruments.	3.6
	f.	Give post-operative care under the veterinarian's supervision.	3.6
	g.	Prepare himself to be a non-sterile assistant for surgery.	3.4

11.	Pharmacology.	3.0
a.	Know the classification, uses, and means of administration of various drugs and biologicals.	3.2
b.	Identify and understand the different kinds of biological products.	3.1
c.	Restock a practice vehicle and/or take care of the drug inventory.	3.1
d.	Know the metric and avoirdupois systems of measurements and the conversion factors between them.	2.9
12.	Clinical pathology.	3.3
	Hematology	
a.	Do a WBC.	3.9
b.	Do a hematocrit.	3.8
c.	Make blood smear and use proper stain.	3.8
d.	Draw blood samples from all collection sites in all species.	3.7
e.	Collect blood samples in tubes with correct anticoagulant.	3.7
f.	Do a hemoglobin determination.	3.6
g.	Do a RBC.	3.5
h.	Do WBC differential.	3.5
i.	Do a sedimentation rate.	3.4
j.	Determine RBC morphology.	3.2
k.	Calculate blood cell indices.	2.9
l.	Do reticulocyte stain and count.	2.9
m.	Determine plasma fibrinogen.	2.7
n.	Do platelet estimation from blood smear.	2.7
o.	Do Lee-White clotting time.	2.4
	Urinalysis	
a.	Perform specific gravity.	3.7
b.	Perform gross examination of urine.	3.7
c.	Catheterize or collect urine from various species of animals.	3.5
d.	Do microscopic examination on urine.	3.5
e.	Do various chemical determination.	3.5
	Parasitology	
a.	Do fecal floatation.	3.7
b.	Identify internal parasites from eggs, etc.	3.7
c.	Perform gross examination of feces.	3.6
d.	Check for external parasites.	3.6
e.	Check for blood parasites.	3.5
f.	Understand the principles of parasite control.	3.5
g.	Perform Hematest.	3.0

	Blood Chemistry	
a.	Collect blood appropriately for various test procedures.	3.8
b.	Perform various calculations correctly.	3.7
c.	Establish and maintain quality control for tests.	3.5
d.	Take proper care of glassware and equipment.	3.4
e.	Know chemistry terms and equipment.	3.0
f.	Perform test by Accustat, Serometer, Ames, Unimeter, etc.	3.0
	Miscellaneous-Clinical Pathology	
a.	Handle a microscope properly.	3.9
b.	Prepare all specimens for shipment.	3.8
c.	Assist with semen evaluation exams.	2.9
d.	Perform Brucellosis card test.	2.7
e.	Run tests on various body fluids, exudates, transudates, spinal fluid.	2.6
13.	Microbiology.	3.2
a.	Practice correct sterile techniques.	3.8
b.	Perform sensitivity tests.	3.5
c.	Isolate, culture, and identify micro-organisms.	3.5
d.	Perform stains on micro-organisms and identify microscopically.	3.2
e.	Perform and evaluate chemical and biological tests for identification.	3.2
f.	Be able to prepare microbiological media.	2.8
g.	Perform limited histological examination.	2.3
14.	Necropsy.	3.5
a.	Handle rabies suspect material and forms.	3.8
b.	Select, pack, and send tissues and organs to laboratories for examination.	3.6
c.	Handle and prepare tissue and organ specimens for shipment.	3.6
d.	Be able to apply proper necropsy techniques and principles.	3.2
e.	Follow correct necropsy procedures in all species.	3.1
15.	Public health.	2.8
a.	Be aware of zoonotic diseases.	2.8
b.	Learn inspection enforcement procedures and the relationship of inspection to public health.	2.8

16.	Personality and character traits.	3.5
a.	Have interest in this work.	3.9
b.	Be educated as required by a technician.	3.8
c.	Have intelligence, ability to learn, solve problems.	3.8
d.	Have knowledge of the field.	3.8
e.	Be persistant - finishing what job he/she starts.	3.8
f.	Develop self-reliance - standing on own feet, make decisions.	3.8
g.	Be cooperative - get along well with others.	3.8
h.	Be diligent - willing to put forth the necessary effort.	3.7
i.	Develop deliberateness - ability to plan ahead.	3.7
j.	Have patience - willing to take the necessary time to work things out.	3.7
k.	Get to work on time.	3.7
l.	Be willing to work the necessary hours the practice is open.	3.7
m.	Have stability, maintaining same job and interests.	3.6
n.	Utilize spare time.	3.6
o.	Be loyal - opinion of people of institutions associated with.	3.6
p.	Avoid absenteeism - at work every day.	3.5
q.	Be aware of appearance, manners.	3.5
r.	Practice honesty - personal integrity.	3.3
s.	Be willing to do menial chores.	3.3
t.	Develop temperance - do not go to extremes.	3.2

FARRIER

Other Titles: Horseshoer, Shoer, Blacksmith.

Job Description:

A Farrier is a skilled craftsman who performs the following major functions: Prepares feet and hooves of horses, mules, and burros, for shoeing; forms and shapes manufactured or handmade shoes; fits and fastens metal shoes to the hooves of horses, mules and burros; handles animals safely and humanely; secures, utilizes, and maintains hand tools, equipment, and supplies needed for farriery work; diagnoses and corrects foot and gait problems through corrective shoeing; manages scheduling, record keeping, billing, collections, taxes, and other aspects of the farrier business. A Farrier secures, applies, and keeps updated in knowledge of: the anatomy of equine feet and legs, techniques in shoeing, use of horseshoeing tools, equipment and supplies, and customer relations. The Farrier works outdoors or in barns, shops, or other enclosures and is semi-protected from the weather; he or she possesses the strength and endurance to work in a stooping position for long periods while supporting an animal's leg; the person exerts independent judgment in determining work procedures, conforming to quality standards and in the complex shaping/angling functions using hand tools. Persons can become horseshoers by attending public college or vocational school courses, private schools, or working with a qualified farrier as an apprentice. Farriers are entrepreneurs who may work "on call," travel a "route," or work primarily at a ranch, a riding stable, a race track, or other horse-related businesses.

Competencies Identified and Validated

N = 36*

Competencies	Weighted Mean**
1. Gain a working knowledge of farriery.	3.5
a. Understand the anatomy and physiology of a horse's foot, pastern, and legs.	3.8
b. Recognize normal and abnormal flight of the foot, common errors in shoeing and their effects on foot and leg structures.	3.8
c. Know the safety practices in handling horses for shoeing.	3.7

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* Responses from 36 Farriers in 11 states. Survey conducted by Department of Agricultural Education, Auburn University, Auburn, Alabama 36830.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	d.	Understand the needs of horsemen.	3.2
	e.	Know metal types and temperatures.	2.8
2.		Secure farrier's equipment.	3.2
	a.	Maintain tools and equipment.	3.5
	b.	Assemble horseshoer tools and equipment.	3.4
	c.	Secure farrier supplies.	3.4
	d.	Select machine-made shoes.	2.7
3.		Use a forge and welder.	3.1
	a.	Build fires in the forge.	3.4
	b.	Make therapeutic shoes.	3.4
	c.	Make bar shoes.	3.3
	d.	Construct horseshoes from barstock.	3.0
	e.	Make brace for broken bones or deformities.	2.6
4.		Perform normal shoeing of a horse (shoes a horse flat).	3.8
	a.	Fit the shoe.	3.9
	b.	Secure the shoe to the hoof wall.	3.9
	c.	Prepare the foot.	3.9
	d.	Make a preliminary examination.	3.8
	e.	Select the shoe.	3.8
	f.	Remove old shoes.	3.7
	g.	Raise and hold the animal's feet for shoeing.	3.6
	h.	Inspect the newly shod animal.	3.5
5.		Practice corrective shoeing.	3.6
	a.	Construct a shoe or modify a factory shoe for treatment of problems.	3.7
	b.	Apply corrective shoes.	3.7
	c.	Inspect the newly shod animal standing and moving (gaits).	3.6
	d.	Diagnose foot problems.	3.6
	e.	Test for lameness.	3.6
	f.	Diagnose faulty gaits.	3.6
	g.	Diagnose conformation faults.	3.5
	h.	Apply treatment.	3.5
6.		Practice special shoeing.	2.9
	a.	Shoe quarterhorses (for shows, working or racing).	3.3
	b.	Shoe thoroughbreds.	3.1
	c.	Shoe standardbreds.	2.9
	d.	Shoe gaited horses.	2.9
	e.	Shoe hunters and jumpers.	2.9
	f.	Shoe draft animals (for show, work, or pulling).	2.7
	g.	Shoe polo horses.	2.6

7.	Handle the problem horse (refractory, vicious).	2.2
a.	Use shanks (lip chain).	2.8
b.	Use a twitch.	2.5
c.	Have tranquilizer administered by a veterinarian.	2.4
d.	Use a cuff and surcingle (for the front leg).	2.2
e.	Use a cuff and sheet bend on the tail (for the hind leg).	2.1
f.	Use scotch hobbles.	2.1
g.	Throw and tie the animal down (as a last resort).	1.8
h.	Use a shoeing stock.	1.6
8.	Manage the farrier business.	3.4
a.	Practice good customer relations.	3.8
b.	Schedule and keep appointments.	3.8
c.	Secure customers.	3.7
d.	Collect fees.	3.6
e.	Set up the business.	3.5
f.	Keep records.	3.4
g.	File taxes.	3.4
h.	Prepare and submit statements.	3.1
i.	Secure insurance.	3.0
j.	Contract for work.	2.7

MANAGER OF GRAIN, FERTILIZER, FEED, AND SEED SALES BUSINESS

Other Titles: Store Manger, Manager Farm Supplies Store, Elevator Manager.

Job Description:

The Manager of a Grain, Fertilizer, Feed, and Seed Business possesses a good knowledge of the various types of farming and ranching including the application of the basic principles of animal, crop, and soil science, agricultural mechanics, economics, and farm and ranch management; is responsible for the workers required to operate the business, defines and supervises duties of employees; is responsible for purchases of products to be sold at a profit, responsible for the repair and maintenance of all buildings and equipment of the business; promotes good customer relations and keeps superiors informed of company progress and problems; with approval of supervisors makes changes in the business as needed based upon trends and experience. Usually employed by privately owned firms, businesses, and organizations.

Competencies Identified and Validated

N = 21*

Competencies	Weighted Mean**
1. Possess desirable personal qualities and qualifications.	2.9
a. Demonstrate the ability to get along with others.	3.7
b. Demonstrate the ability to work on his own.	3.7
c. Demonstrate a willingness to work.	3.6
d. Demonstrate the ability to project a desirable image for the firm.	3.5
e. Demonstrate personal integrity as an employee of the firm.	3.5
f. Budget time.	3.0
g. Maintain a satisfactory attendance record.	2.7
h. Demonstrate desirable job attitude about the organization when working with fellow employees, potential customers, and customers.	2.6
i. Demonstrate a willingness to learn or take supervision.	2.6
j. Demonstrate the ability to follow directions of supervisor.	2.6

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* Responses from 21 higher management level personnel in Grain, Fertilizer, Feed, and Seed Businesses in 4 states. Survey conducted by Department of Agricultural and Industrial Education, Montana State University, Bozeman, Montana 59715.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

k.	Demonstrate acceptable personal appearance and personal hygiene.	2.5
l.	Schedule jobs.	2.0
m.	Accept routine tasks without becoming disinterested.	1.2
2.	Practice good human relations.	3.3
a.	See and report the customer's point of view.	3.4
b.	Empathize with customer.	3.2
3.	Animal science - nutrition.	2.9
a.	Recommend feeding programs which will eliminate problems of chemical residues in meat, milk, and eggs.	3.1
b.	Balance rations for different types of livestock and poultry of various ages.	3.1
c.	Recommend the use of additives and medications in compliance with FDA standards.	3.1
d.	Formulate feeds so as to balance economically grains grown on the farm.	3.0
e.	Explain the purpose of feed additives and medications.	3.0
f.	Determine feed needs in terms of nutrients for growth, production, and reproduction.	2.9
g.	Read and explain the meaning of the ingredients listed on a feed tag.	2.8
h.	Recommend feed additives and medication in relation to cost and suitability.	2.8
i.	Evaluate livestock quality and recommend compatible feeding programs.	2.8
j.	Determine suitability of feeds for ruminants and nonruminants.	2.8
k.	Plan alternative feeding programs for different types of livestock using feeds available in the area.	2.7
l.	Substitute various feed ingredients in balancing rations.	2.7
m.	Compute feed required for pound of gain for each major livestock group.	2.7
n.	Classify feeds in terms of nutrients and energy value.	2.7
o.	Determine the form (pelleted, rolled, ground, etc.) in which feeds should be prepared for livestock and poultry.	2.7
p.	Determine the quality of hay and silage in terms of feeding value (judgment, lab analysis, etc.).	2.6
q.	Classify feeds according to mineral content.	2.2

	r.	Compute the conversion of nitrogen from non-protein sources to protein.	2.0
	s.	Trace the passage of feed through digestive processes of various animals.	1.8
	t.	Analyze feeds for fats, nitrogen, nitrogen-free extract, fiber, and ash.	1.7
4.	Animal science - animal care and handling.		2.3
	a.	Assist with planning alternative systems of livestock management.	2.3
	b.	Identify hazards that may cause fire, injury, or poisoning to livestock and poultry.	2.3
5.	Animal science - identification and disease control.		2.0
	a.	Identify symptoms in animals and birds suffering from deficiencies of essential nutritive elements in feeding rations.	2.5
	b.	Identify and plan corrective measures for common livestock diseases and parasites.	2.4
	c.	Recommend treatment for animals and poultry suffering from parasites.	2.2
	d.	Post animals or birds to determine internal parasites.	1.0
6.	Plant science - general knowledge.		2.3
	a.	Compute weight loss incurred in drying grain.	2.9
	b.	Compute cost of drying grain.	2.7
	c.	Recommend accepted crop management practices to improve volume of grain produced.	2.6
	d.	Explain crop adaptation in terms of factors related to soil, climate, and economics.	1.6
	e.	Assist in planning alternative cropping systems.	1.6
7.	Plant science - seed propagation.		2.2
	a.	Analyze seed samples and properly label for sale.	2.4
	b.	Test seed for germination.	1.9
8.	Plant science - fertilizer.		2.5
	a.	Recommend a fertilizer program (timing, placement, etc.).	3.1
	b.	Determine relative amounts of different kinds and types of fertilizers to be applied per acre.	3.0
	c.	Formulate fertilizer to specification.	2.7
	d.	Assist with planning alternative measures of fertilizer applications.	2.7
	e.	Substitute fertilizer ingredients according to economic and agronomic conditions.	2.5
	f.	Formulate herbicide-fertilizer mixtures.	2.3

g.	Explain the process of manufacturing fertilizers.	1.5
9.	Plant science - hazards of contamination by insects and weeds.	2.9
a.	Identify various types of grain damage.	3.6
b.	Identify materials that might contaminate grain because of odors.	3.4
c.	Identify sources of grain contamination and recommends complete programs of grain sanitation.	3.3
d.	Treat grain properly and safely for insect control.	3.3
e.	Recommend weed control programs.	2.8
f.	Identify weeds and weed seeds commonly found in crops grown locally.	2.4
g.	Identify and classify insect damage.	2.3
h.	Identify seed-borne diseases.	2.2
10.	Plant science - agricultural chemicals.	2.7
a.	Recommend proper time to use chemicals (weeds, crops, insects, etc.).	3.1
b.	Time chemical applications to avoid residue problems.	3.0
c.	Interpret chemical labels.	3.0
d.	Compute amounts of active ingredients of chemicals to be used.	3.0
e.	Recommend insecticides needed.	2.8
f.	Name sources of information regarding laws and regulations governing the use of agricultural chemicals.	2.5
g.	Explain the function of various chemical elements in plant growth.	2.5
h.	Weigh and measure relatively small quantities of chemicals.	1.9
11.	Agricultural mechanics - special equipment maintenance.	3.0
a.	Care for and maintain scales.	3.0
12.	Agricultural mechanics - equipment, supplies and materials - recommendations and selection.	2.7
a.	Select proper equipment to combat fire.	3.5
b.	Recommend crop varieties that will maximize returns in terms of yield and market acceptance.	2.9
c.	Recommend the kinds of equipment commonly needed in a grain, feed, seed, and fertilizer facility.	2.2

13.	Agricultural mechanics - equipment operation, specialized equipment.		3.2
	a.	Weigh grain as it arrives at the elevator.	3.6
	b.	Operate seed-treating and seed-cleaning equipment.	3.2
	c.	Operate and adjust equipment commonly used in a grain, feed, seed, and fertilizer facility.	2.9
14.	Agricultural mechanics - equipment operation, testing and analysis devices.		3.4
	a.	Use balances, moisture testers, screens, and dockage machines used in grading grain.	3.7
	b.	Operate and read devices for detecting heating of grain in storage (hot spots).	3.0
15.	Agricultural mechanics - equipment operation, major equipment.		2.5
	a.	Draw a representative sample of grain from a truck or car.	3.7
	b.	Calibrate farm implements to apply specific amounts of chemicals.	2.2
	c.	Recommend and make machinery adjustments which will result in harvesting quality grain.	1.5
16.	Agricultural mechanics - equipment operation, office equipment.		3.4
	a.	Use the telephone for business transactions.	3.4
17.	Agricultural mechanics - agricultural buildings and convenience - construction.		1.7
	a.	Diagram efficient facility layouts for modern grain, feed, seed, and fertilizer operations.	1.7
	b.	Plan and develop mechanical feeding systems.	1.7
18.	Agricultural mechanics - soil and water management, soils.		2.1
	a.	Interpret soil tests.	2.9
	b.	Take soil samples for fertilizer analysis.	2.8
	c.	Recommend treatment to adjust pH to appropriate levels.	2.6
	d.	Explain the importance of soil pH to plant adaptability.	2.6
	e.	Identify soil deficiencies from symptoms of growing plants.	2.4
	f.	Test soils for pH levels.	2.4
	g.	Determine the adaptability of soils to crops to be grown.	1.8

	h.	Identify soils problems that may be due to lack of drainage or lack of water.	1.4
19.		Agricultural business management and marketing - general management.	2.9
	a.	Understand federal and state laws regarding grain, feed, seed, and fertilizer business.	3.4
	b.	Understand the legal responsibilities of a business serving the public.	3.1
	c.	Develop objectives for the business that can be used by management to promote business growth.	3.1
	d.	Explain and use contracts and other legal instruments needed in the business operation.	2.9
	e.	Understand the types of business organization.	2.9
	f.	Understand the advantages and disadvantages of different types of business organization.	2.8
	g.	Understand and be able to apply the basic requirements for starting a business.	2.7
	h.	Explain how environmental factors affect the feed efficiency of livestock enterprises.	2.5
20.		Agricultural business management and marketing - financial management, analysis and assessment.	2.3
	a.	Prepare and interpret a financial statement for the business.	3.1
	b.	Understand the sources of capital for each type of business.	3.0
	c.	Estimate customer wants and needs from past records.	2.8
	d.	Compute costs and returns in determining the use of agricultural chemicals.	2.6
	e.	Develop a hedging program appropriate for a country elevator.	1.9
	f.	Determine from crop reports potential volume of grain produced in elevator trade territory.	1.5
	g.	Analyze costs and returns of such improvement projects as drainage, liming, fertilizers.	1.3
21.		Agricultural business management and marketing - financial management, purchasing and budgeting.	2.5
	a.	Use business goals for preparing a total business budget.	3.0
	b.	Prepare a livestock or poultry feeding budget, estimating feed costs, value of product, and return over feed costs.	2.8
	c.	Prepare advertising budget.	2.4
	d.	Prepare a budget, estimating costs of production and returns per acre or major crops produced in area.	1.7

22.	Agricultural business management and marketing - financial management, credit.	3.4
a.	Develop a sound credit policy for a grain, feed, seed, and fertilizer business.	3.7
b.	Evaluate financial statements to determine credit risks of farmers and ranchers.	3.3
c.	Compute the cost of granting credit.	3.3
d.	Identify and recommend sources of credit available in the community.	3.2
23.	Agricultural business management and marketing - financial management - marketing.	2.6
a.	Determine the possible returns from different methods of selling grain.	3.3
b.	Explain the relationship of cash grain prices to future.	3.1
c.	Locate sources of market information.	3.0
d.	Interpret market information in market bulletin, newspapers, and radio.	3.0
e.	Understand and be able to apply the basic principles of economics to the distribution and marketing of grain, feed, seed, and fertilizer.	2.7
f.	Identify economic and environmental factors that influence types of livestock and poultry which should be produced in an area.	2.3
g.	Develop a basis chart for various commodities.	2.3
h.	Conduct a market survey.	2.3
i.	Assist farmers and ranchers in determining the most economical ways to market livestock.	2.2
j.	Determine when livestock are ready for market.	2.0
k.	Suggest how livestock producers can use the futures market as a market tool.	2.0
24.	Agricultural business management and marketing - financial management - pricing.	3.4
a.	Price grain based on grade, weight, and quality.	3.7
b.	Understand the role of prices in the marketplace.	3.4
c.	Compute margins.	3.4
d.	Compute markup.	3.4
e.	Explain the relationship of markup to margin.	3.2
25.	Agricultural business management and marketing - financial management - profits.	3.6
a.	Understand how each type of business organization divides its profits or losses.	3.9

	b.	Understand the importance and the function of business profits.	3.3
26.		Merchandising - salesmanship and selling.	3.0
	a.	Quote grain prices to farmers.	3.7
	b.	Close a sale.	3.4
	c.	Demonstrate the steps of successful farm and ranch calls.	2.8
	d.	Demonstrate the steps of successful selling.	2.8
	e.	Demonstrate the use of different types of sales techniques. (Telephone, face-to-face, etc.).	2.5
27.		Merchandising - promotion.	2.4
	a.	Organize a facility for effective merchandising.	2.8
	b.	Organize and conduct sales meetings.	2.6
	c.	Plan and conduct fertilizer and agricultural chemical demonstrations.	2.4
	d.	Plan and carry out promotion days.	2.3
	e.	Recognize potential customers identified from market studies.	2.3
	f.	Plan and conduct feeding demonstrations.	2.3
	g.	Organize and conduct clinics for customers and staff members.	2.2
	h.	Prepare and present demonstrations.	2.2
	i.	Prepare and present public speeches.	2.1
28.		Merchandising - displays and advertising.	2.2
	a.	Develop a monthly advertising calendar.	2.3
	b.	Develop displays.	2.0
29.		Merchandising - stock control and inventory.	3.1
	a.	Develop an effective system of inventory control.	3.1
30.		Merchandising - quality control.	2.7
	a.	Grade grain according to USDA Grain Standards Act.	3.5
	b.	Blend various qualities of grain to meet grade.	3.4
	c.	Use aeration, drying, and turning techniques to preserve grain quality.	3.2
	d.	Conduct various types of tests to determine protein in grain.	2.6
	e.	Prepare seed to meet state certification laws.	2.1
	f.	Conduct field inspection for producing certified seed.	1.6
31.		Merchandising, receiving, packaging, and labeling.	2.8
	a.	Label and market seed in accordance with state laws.	2.8

	b.	Prepare labels for treated seed to meet government regulations.	2.7
32.	Merchandising - shipping.		3.4
	a.	Load cars or trucks with grain for shipment.	3.4
33.	Clerical - writing letters and reports.		2.1
	a.	Prepare clear, concise written reports.	2.7
	b.	Prepare letters to customers.	2.7
	c.	Write advertising.	1.9
	d.	Prepare news releases.	1.7
	e.	Prepare radio and TV scripts.	1.7
34.	Clerical - business forms.		3.3
	a.	Prepare warehouse receipts.	3.6
	b.	Prepare scale tickets.	3.5
	c.	Write up sales tickets.	3.5
	d.	Prepare Bills of Lading.	3.3
	e.	Prepare purchase orders.	2.8

GRAIN, FERTILIZER, FEED AND SEED SALES BUSINESS OCCUPATIONS

COUNTERMAN

Other Title: Salesman.

Job Description: Must have a wide knowledge of farming and ranching and a good understanding of local livestock and crop production practices and problems. Thoroughly familiar with all products which the business stocks for sale. Knows most customers. Fills customer orders and completes record of sales. Keeps inventory of stock on hand and reorders items in short supply. Is usually employed by privately owned firms, businesses, and organizations.

HELPER

Other Title: Worker.

Job Description: A general knowledge of farming and ranching is needed by this employee. He follows instructions of supervisors in filling customers orders, stocks supplies, and assists other employees of the business when his services are needed. He helps to keep buildings clean and orderly, helps load trucks, drives trucks and other equipment used in the business. Is usually employed by privately owned firms, businesses, and organizations.

SALES AND SERVICE REPRESENTATIVE

Other Title: Salesman.

Job Description: A thorough knowledge of farming and ranching is a must for this employee. He should quickly recognize the specific needs of prospective customers and provide them with alternative solutions to their needs which the business he represents can provide. He must have a knowledge of the customer's ability to pay for purchases and the amount of credit which may be offered to various customers. He must have a thorough knowledge of all materials, supplies, and items his company offers for sale, the quantity on hand, their location, and price. He must be considerate with customers and promote good customer relations with the business he represents which is usually privately owned.

BOOKKEEPER

Other Title: Secretary.

Job Description: Must have a general knowledge of farming and ranching. Must have good knowledge of keeping financial accounts and records including purchases, sales, charge accounts, monthly billings, and federal and state tax reporting. Is responsible for inventory control. Must have skill in typing. Is usually employed by privately owned firms, businesses, and organizations.

DRIVER

Other Titles: Truck Driver, Deliveryman.

Job Description: Should have a good general knowledge of farming and ranching. Must be familiar with location of customer's farms and ranches including location of nearby towns and centers of transportation including railroads. Must know how to properly load and unload trucks quickly and safely. Should possess a thorough knowledge of the proper operation and maintenance of trucks, and understand the mechanics of gasoline engines. Must be a skilled and safe driver of trucks and autos; be tactful with customers and promote good customer relations. Must have a good knowledge of all materials and supplies his business sells. Is usually employed by privately owned firms, businesses, and organizations.

Competencies Identified and Validated*

	Weighted Means by Occupation**				
	N 36	N 36	N 41	N 41	N 34
Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
1. Possess desirable personal qualities and qualifications.	3.5	3.3	3.0	3.3	3.1
a. Demonstrate the ability to get along with others.	3.6	3.9	4.0	3.5	3.2
b. Demonstrate the ability to work on his own.	4.0	3.3	2.5	3.4	3.3

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* Responses from persons employed in these occupations or their work supervisors in 16 states. Survey conducted by Department of Agricultural Education, North Dakota State University, Fargo, North Dakota 58102.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
c. Demonstrate a willingness to work.	3.4	3.3	3.7	3.3	3.3
d. Demonstrate the ability to project a desirable image for the firm.	3.5	3.0	3.8	3.3	3.3
e. Demonstrate personal integrity as an employee of the firm.	3.5	3.3	3.8	3.6	3.4
f. Budget time.	3.0	2.6	3.5	3.4	2.9
g. Maintain a satisfactory attendance record.	4.0	3.2	3.4	3.4	3.2
h. Demonstrate desirable job attitude about the organization when working with fellow employees, potential customers and customers.	3.6	3.2	3.6	3.3	3.3
i. Demonstrate a willingness to learn or take supervision.	3.2	3.2	3.4	3.4	3.1
j. Demonstrate the ability to follow directions of supervisor.	2.4	3.4	3.3	3.4	3.2
k. Demonstrate acceptable personal appearance and personal hygiene.	3.1	2.7	3.5	3.3	3.1
l. Schedule jobs.	2.7	2.1	3.3	2.9	2.5
m. Accept routine tasks without becoming disinterested.	2.9	3.0	3.0	2.2	2.9
2. Practice good human relations.	2.9	2.4	2.9	2.6	2.8
a. See and report the customer's point of view.	3.0	2.5	3.4	2.6	2.9
b. Empathize with customer.	2.8	2.3	2.4	2.5	2.6
3. Animal science - nutrition.	1.8	0.6	2.4	0.3	0.5
a. Recommend feeding programs which will eliminate problems of chemical residues in meat, milk and eggs.	1.9	.8	2.7	.3	.6
b. Balance rations for different types of livestock and poultry of various ages.	1.9	.7	2.6	.3	.5
c. Recommend the use of additives and medications in compliance with FDA standards.	2.1	.8	2.7	.3	.5
d. Formulate feeds so as to balance economically grains grown on the farm.	1.9	.7	2.7	.3	.5

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
e. Explain the purpose of feed additives and medications.	2.2	.8	2.6	.3	.5
f. Determine feed needs in terms of nutrients for growth, production and reproduction.	1.9	.7	2.5	.3	.6
g. Read and explain the meaning of the ingredients listed on a feed tag.	2.1	.9	2.6	.5	.7
h. Recommend feed additives and medication in relation to cost and suitability.	2.1	.6	2.6	.3	.5
i. Evaluate livestock quality and recommend compatible feeding programs.	2.1	.5	2.4	.2	.5
j. Determine suitability of feeds for ruminants, nonruminants.	2.2	.6	2.5	.2	.5
k. Plan alternative feeding programs for different types of livestock using feeds available in the area.	1.9	.5	2.6	.3	.4
l. Substitute various feed ingredients in balancing rations.	1.8	.5	2.4	.3	.5
m. Compute feed required for pound of gain for each major livestock group.	1.8	.5	2.4	.2	.5
n. Classify feeds in terms of nutrients and energy value.	1.7	.5	2.4	.2	.5
o. Determine the form (pelleted, rolled, ground, etc.) in which feeds should be prepared for livestock and poultry.	1.7	.6	2.4	.2	.5
p. Determine the quality of hay and silage in terms of feeding value (judgment, lab analysis, etc.).	1.6	.4	2.5	.2	.5
q. Classify feeds according to mineral content.	1.5	.4	2.2	.3	.5
r. Compute the conversion of nitrogen from non-protein to protein.	1.4	.4	2.3	.4	.5
s. Trace the passage of feed through digestive processes of various animals.	1.3	.4	2.0	.2	.4

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
t. Analyze feeds for fats, nitrogen-free extract, fiber and ash.	.8	.4	1.6	.3	.4
4. Animal science - animal care and handling.	1.7	.8	2.5	.5	1.0
a. Assist with planning alternative systems of livestock management.	1.6	.5	2.5	.4	.7
b. Identify hazards that may cause fire, injury or poisoning to livestock and poultry.	1.7	1.0	2.4	.5	1.3
5. Animal science - identification and disease control.	1.5	.5	2.3	.2	.5
a. Identify symptoms in animals and birds suffering from deficiencies of essential nutritive elements in feeding rations.	1.4	.7	2.4	.2	.7
b. Identify and plans corrective measures for common livestock diseases and parasites.	1.5	.5	2.4	.2	.5
c. Recommend treatment for animals and poultry suffering from parasites.	1.9	.5	2.4	.2	.5
d. Post animals or birds to determine internal parasites.	1.1	.4	1.8	.2	.3
6. Plant science - general knowledge.	2.2	.9	2.6	1.3	.5
a. Compute weight loss incurred in drying grain.	2.3	1.1	2.3	2.2	.5
b. Compute cost of drying grain.	2.2	1.0	2.3	2.2	.4
c. Recommend accepted crop management practices to improve volume of grain produced.	2.5	.9	3.0	.9	.5
d. Explain crop adaptation in terms of factors related to soil, climate and economics.	2.2	.8	2.8	.6	.5
e. Assist in planning alternative cropping systems.	1.9	.7	2.8	.6	.4
7. Plant science - seed propagation.	1.5	1.1	1.5	.5	.5
a. Analyze seed samples and properly label for sale.	1.5	1.0	1.6	.6	.5
b. Test seed for germination.	1.4	1.2	1.3	.4	.4

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
8. Plant science - fertilizer.	2.3	.9	2.7	.6	.5
a. Recommend a fertilizer program (timing, placement, etc.).	2.8	.9	3.0	.5	.6
b. Determine relative amounts of different kinds and types of fertilizers to be applied per acre.	2.9	.9	3.1	.6	.6
c. Formulate fertilizer to specification.	2.2	.9	2.4	.7	.5
d. Assist with planning alternative measures of fertilizer applications.	2.3	.9	2.8	.6	.5
e. Substitute fertilizer ingredients according to economic and agronomic conditions.	1.9	.8	2.5	.6	.4
f. Formulate herbicide-fertilizer mixtures.	2.1	.9	2.8	.5	.3
g. Explain the process of manufacturing fertilizers.	1.8	.8	2.2	.5	.6
9. Plant science - hazards (insects, weeds, damage and contamination).	2.3	1.6	2.7	.5	1.0
a. Identify various types of grain damage.	2.6	2.4	2.6	.6	1.1
b. Identify materials that might contaminate grain because of odors.	2.5	2.0	2.5	.6	1.6
c. Identify sources of grain contamination and recommend complete programs of grain sanitation.	2.6	1.6	2.7	.6	1.3
d. Treat grain properly and safely for insect control.	2.1	2.2	2.1	.5	1.2
e. Recommend weed control programs.	2.6	.8	3.1	.6	.6
f. Identify weeds and weed seeds commonly found in crops grown locally.	2.3	1.3	2.9	.4	.7
g. Identify and classify insect damage.	2.1	1.3	2.9	.4	.8
h. Identify seed-borne diseases.	1.9	1.0	2.8	.4	.3

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
10. Plant science - agricultural chemicals.	2.4	1.1	2.9	.6	.6
a. Recommend proper time to use chemicals (weeds, crops, insects, etc.).	2.9	1.1	3.1	.7	.7
b. Time chemical applications to avoid residue problems.	2.5	1.1	2.9	.6	.6
c. Interpret chemical labels.	2.7	1.3	3.1	.8	.8
d. Compute amounts of active ingredients of chemicals to be used.	2.6	1.2	3.1	.6	.6
e. Recommend insecticides needed.	2.7	1.2	3.1	.6	.5
f. Name sources of information regarding laws and regulations governing the use of agricultural chemicals.	2.4	1.2	2.9	.8	.7
g. Explain the function of various chemical elements in plant growth.	2.1	.9	2.6	.5	.5
h. Weigh and measure relatively small quantities of chemicals.	1.6	1.1	2.1	.5	.7
11. Agricultural mechanics - special equipment maintenance.	2.1	1.7	1.6	.7	1.2
a. Care for and maintain scales.	2.1	1.7	1.6	.7	1.2
12. Agricultural mechanics - equipment, supplies and materials recommendations and selections.	2.1	1.4	2.0	.8	1.1
a. Select proper equipment to combat fire.	1.9	1.9	1.8	1.0	2.1
b. Recommend crop varieties that will maximize returns in terms of yield and market acceptance.	2.5	1.1	3.0	.6	.6
c. Recommend the kinds of equipment commonly needed in a grain, feed, seed and fertilizer facility.	1.8	1.2	2.1	.4	.7
13. Agricultural mechanics - equipment operation - various specialized equipment.	2.1	2.6	1.6	1.0	1.7
a. Weigh grain as it arrives at the elevator.	2.8	2.3	1.9	2.1	2.2

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
b. Operate seed-treating and seed-cleaning equipment.	1.6	2.5	1.2	.4	1.2
c. Operate and adjust equipment commonly used in a grain, feed, seed and fertilizer facility.	2.0	2.9	1.6	.4	1.6
14. Agricultural mechanics - equipment operation - testing and analysis devices.	2.9	2.5	1.8	1.7	1.1
a. Use balances, moisture testers, screens and dockage machines used in grading grain.	3.1	2.5	2.0	2.1	1.1
b. Operate and read devices for detecting heating of grain in storage (hot spots).	2.6	2.5	1.6	1.3	1.0
15. Agricultural mechanics - equipment operation - major equipment.	2.0	2.0	2.0	.8	1.5
a. Draw a representative sample of grain from a truck or car.	3.1	3.0	1.9	1.6	1.9
b. Calibrate farm implements to apply specific amounts of chemicals.	1.5	1.7	2.2	.4	1.4
c. Recommend and make machinery adjustments which will result in harvesting quality grain.	1.4	1.2	1.9	.3	1.1
16. Agricultural mechanics - equipment operation - office equipment.	3.2	1.6	3.4	3.6	1.8
a. Use the telephone for business transactions.	3.2	1.6	3.4	3.6	1.8
17. Agricultural mechanics - agricultural buildings and convenience - construction.	1.0	.6	1.8	.4	.5
a. Diagram efficient facility layouts for modern grain, feed, seed and fertilizer operations.	.9	.6	1.6	.5	.4
b. Plan and develop mechanical feeding systems.	1.0	.5	1.9	.3	.5

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
18. Agricultural mechanics - soil and water management - soils.	1.9	1.1	2.4	.5	.5
a. Interpret soil tests.	2.2	1.1	2.8	.7	.5
b. Take soil samples for fertilizer analysis.	1.6	1.7	2.5	.4	.9
c. Recommend treatment to adjust pH to appropriate levels.	2.1	1.2	2.6	.6	.4
d. Explain the importance of soil pH to plant adaptability.	2.3	1.1	2.6	.5	.5
e. Identify soil deficiencies from symptoms of growing plants.	1.9	1.0	2.6	.5	.5
f. Test soils for pH levels.	1.5	.9	2.1	.4	.5
g. Determine the adaptability of soils to crops to be grown.	1.8	1.0	1.7	.4	.4
h. Identify soils problems that may be due to lack of drainage or lack of water.	1.6	1.0	2.5	.4	.5
19. Agricultural business management and marketing - general management.	2.1	1.3	2.5	2.0	.9
a. Understand federal and state laws regarding grain, feed, seed and fertilizer business.	2.7	1.9	3.0	2.5	1.5
b. Understand the legal responsibilities of a business serving the public.	2.7	2.0	3.0	1.7	1.6
c. Develop objectives for the business that can be used by management to promote business growth.	2.0	1.4	2.4	2.0	.8
d. Explain and use contracts and other legal instruments needed in the business operation.	2.2	1.2	2.6	2.5	.6
e. Understand the types of business organization.	2.0	1.1	2.5	2.2	.7
f. Understand the advantages and disadvantages of different types of business organization.	1.9	.9	2.1	2.2	.7
g. Understand and is able to apply the basic requirements for starting a business.	1.5	.8	2.1	2.1	.5
h. Explain how environmental factors affect the feed efficiency of livestock enterprises.	2.0	.9	2.6	.7	.7

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
20. Agricultural business management and marketing - financial management - analysis and assessment.	1.6	.9	2.2	1.9	.5
a. Prepare and interpret a financial statement for the business.	1.1	1.3	1.7	2.8	.4
b. Understand the sources of capital for each type of business.	1.1	.6	1.6	2.4	.4
c. Estimate customer wants and needs from past records.	2.4	1.2	2.7	2.4	.8
d. Compute costs and returns in determining the use of agricultural chemicals.	2.2	.8	2.6	1.5	.4
e. Develop a hedging program appropriate for a country elevator.	1.1	.6	1.2	1.3	.3
f. Determine from crop reports potential volume of grain produced in elevator trade territory.	1.7	.9	2.1	2.0	.5
g. Analyze costs and returns of such improvement projects as drainage, liming, fertilizers.	1.5	.6	3.2	.8	.4
21. Agricultural business management and marketing - financial management - purchasing and budgeting.	1.4	.6	2.0	1.3	.3
a. Use business goals for preparing a total business budget.	1.3	.7	1.7	2.0	.3
b. Prepares a livestock or poultry feeding budget, estimating feed costs, value of product and return over feed costs.	1.5	.5	2.2	.8	.3
c. Prepare advertising budget.	1.3	.5	1.8	1.6	.3
d. Prepare a budget, estimating costs of production and returns per acre or major crops produced in area.	1.6	.6	2.4	.8	.3
22. Agricultural business management and marketing - financial management - credit.	1.6	.7	2.3	2.1	.4
a. Develop a sound credit policy for a grain, feed, seed and fertilizer business.	1.6	.9	2.0	1.8	.5

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
b. Evaluate financial statements to determine credit risks of farmers and ranchers.	1.6	.8	2.4	2.3	.4
c. Compute the cost of granting credit.	1.5	.7	2.2	2.2	.4
d. Identify and recommend sources of credit available in the community.	1.7	.5	2.4	2.0	.4
23. Agricultural business management and marketing - financial management - marketing.	1.6	.8	2.1	1.2	.4
a. Determine the possible returns from different methods of selling grain.	1.7	.8	2.1	1.6	.4
b. Explain the relationship of cash grain prices to futures.	1.6	.7	2.1	1.7	.3
c. Locate sources of market information.	1.8	.8	2.1	1.6	.4
d. Interpret market information in market bulletin, newspapers and radio.	1.9	.9	2.3	1.5	.6
e. Understand and is able to apply the basic principles of economics to the distribution and marketing of grain, feed, fertilizer and seed.	1.8	.8	2.4	1.7	.5
f. Identify economic and environmental factors that influence types of livestock and poultry which should be produced in an area.	1.5	.6	2.3	.8	.4
g. Develop a basis chart for various commodities.	1.3	.6	1.4	1.5	.3
h. Conduct a market survey.	1.7	.6	2.2	1.3	.4
i. Assist farmers and ranchers in determining the most economical ways to market livestock.	1.5	.5	2.3	.7	.5
j. Determine when livestock are ready for market.	1.2	.6	2.0	.4	.6
k. Suggest how livestock producers can use the futures market as a market tool.	1.5	.5	2.1	2.4	.6

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
24. Agricultural business management and marketing - financial management pricing.	2.1	1.2	2.1	2.4	.6
a. Price grain based on grade, weight and quality.	2.1	1.4	2.1	2.4	.7
b. Understand the role of prices in the marketplace.	2.5	1.5	2.6	2.1	.9
c. Compute margins.	2.0	1.0	2.0	2.5	.5
d. Compute markup.	2.1	1.2	2.0	2.5	.5
e. Explain the relationship of markup to margin.	1.7	.9	2.0	2.6	.5
25. Agricultural business management and marketing - financial management - profits.	2.1	1.1	2.6	2.7	1.0
a. Understand how each type of business organization divides its profits or losses.	1.8	.9	2.1	2.6	.8
b. Understand the importance and the function of business profits.	2.4	1.2	3.1	2.7	1.2
26. Merchandising - salesmanship and selling.	3.8	1.4	3.2	1.9	.9
a. Quote grain prices to farmers.	3.3	1.6	3.0	2.7	1.1
b. Close a sale.	3.3	1.4	3.4	2.3	.9
c. Demonstrate the steps of successful selling.	2.7	1.3	3.2	1.8	.8
d. Demonstrate the techniques for successful farm and ranch calls.	2.3	1.4	3.2	1.0	1.0
e. Demonstrate the use of different types of sales techniques (telephone, face-to-face, etc.).	2.9	1.4	3.3	1.6	.9
27. Merchandising - promotion.	2.0	.7	2.7	.7	.5
a. Organize a facility for effective merchandising.	2.3	1.0	2.3	1.1	.5
b. Organize and conduct sales meetings.	1.8	.8	2.9	.7	.5
c. Plan and conduct fertilizer and agricultural chemical demonstrations.	2.2	.8	2.8	.6	.5

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
d. Plan and carry out promotion days.	2.3	.8	2.8	.8	.5
e. Recognize potential customers identified from market studies.	2.3	.9	2.9	1.1	.8
f. Plan and conduct feeding demonstrations.	1.5	.6	2.7	.5	.5
g. Organize and conduct clinics for customers and staff members.	1.7	.5	2.7	.6	.4
h. Prepare and present demonstrations.	1.8	.7	2.7	.5	.4
i. Prepare and present public speeches.	1.7	.6	2.6	.7	.4
28. Merchandising - displays and advertising.	2.2	.8	2.1	1.0	.4
a. Develop a monthly advertising calendar.	1.9	.6	2.0	1.0	.4
b. Develop displays.	2.4	1.0	2.2	1.0	.4
29. Merchandising - stock control and inventory.	2.4	1.4	1.7	2.3	.8
a. Develop an effective system of inventory control.	2.4	1.4	1.7	2.3	.8
30. Merchandising - quality control.	1.7	1.8	1.6	.9	.8
a. Grade grain according to USDA Grain Standards Act.	2.9	2.1	2.0	1.8	1.0
b. Blend various qualities of grain to meet grade.	2.0	2.5	1.6	.9	1.2
c. Use aeration, drying and turning techniques to preserve grain quality.	1.9	2.6	1.5	.8	1.0
d. Conduct various types of tests to determine protein in grain.	1.1	1.3	1.3	.4	.6
e. Prepare seed to meet state certification laws.	1.2	1.4	1.3	.6	.6
f. Conduct field inspection for producing certified seed.	.9	.9	1.7	.6	.5
31. Merchandising - receiving, packaging and labeling.	1.8	1.3	1.7	1.0	.8
a. Label and market seed in accordance with state laws.	1.7	1.4	1.8	.8	.8

Competencies	Counterman	Helper	Sales & Service Representative	Bookkeeper	Driver
b. Prepare labels for treated seed to meet government regulations.	1.8	1.1	1.6	1.1	.7
32. Merchandising - shipping.	1.3	3.3	1.1	.5	2.7
a. Load cars or trucks with grain for shipment.	1.3	3.3	1.1	.5	2.7
33. Clerical - writing letters and reports.	1.7	.9	2.2	2.3	.7
a. Prepare clear, concise written reports.	2.2	1.3	3.0	3.4	1.2
b. Prepare letters to customers.	2.1	.9	2.6	3.2	.4
c. Write advertising.	1.6	.8	2.1	2.1	.6
d. Prepare news releases.	1.4	.7	1.6	1.5	.6
e. Prepare radio and TV scripts.	1.3	.7	1.8	1.4	.6
34. Clerical - business forms.	2.8	1.6	1.5	3.4	1.0
a. Prepare warehouse receipts.	2.3	1.2	1.3	3.5	.5
b. Prepare scale tickets.	3.0	2.1	1.7	3.6	1.3
c. Write up sales tickets.	3.3	2.0	2.2	3.3	1.3
d. Prepare Bills of Lading.	2.6	1.6	1.3	3.5	1.0
e. Prepare purchase orders.	3.0	1.3	1.7	3.3	.7

DAIRY INSPECTOR

Job Description:

Persons in this occupation are largely responsible for quality control of raw milk. They inspect dairy farms from which milk is sold to make sure that certain municipal, state, and federal rules and regulations are being followed. Milk inspectors travel to the farms that ship milk to a particular dairy plant. At each farmstead, they check sanitary conditions in the dairy barn, the milkhouse and the area around the buildings to see that they are in keeping with the dairy plant's requirements and legal sanitary regulations. An inspection may involve the milk house, condition of milking and milk house equipment, manure disposal, fly control, and housing livestock other than dairy animals in the dairy barn. An inspector must foster goodwill among milk producers, procure milk for the dairy plant for which he works, keep the necessary records of inspection and make reports to farmers.

Competencies Identified and Validated

N = 33*

Competencies	Weighted Mean**
1. Have knowledge of milk composition.	2.9
a. Know water percentages.	3.4
b. Know butterfat content.	3.2
c. Know solids not fats (SNF).	3.0
d. Know mineral content.	2.4
e. Know vitamin D content.	2.3
2. Have general knowledge of the dairy industry.	3.3
a. Store milk.	3.9
b. Know problems associated with handling milking.	3.8
c. Transport milk.	3.8
d. Can market to wholesalers and retailers.	2.9
e. Reproduce animals.	2.8
(1) Colostrum.	3.0
(2) Gestation.	2.6
f. Animal nutrition.	2.5
(1) Fiber content.	2.7
(2) Protein content.	2.6
(3) Fat content.	2.6

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* Responses from 33 Dairy Inspectors in 30 states. Survey conducted by Department of Agricultural Education, North Carolina A & T State University, Greensboro, North Carolina 27411.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

		(4) Roughages.	2.6
		(5) Concentrates.	2.5
		(6) Mineral content.	2.3
		(7) Vitamin content.	2.3
		(8) Carbohydrate content.	2.3
3.	Know sanitation regulations and practices.		3.6
	a.	Know federal, state, and local regulations.	3.9
	b.	Know the proper sanitation for equipment and facilities.	3.9
	c.	Know disease carrying organisms found in milk.	3.7
	d.	Understand the use of chemicals.	3.6
	e.	Know preventive procedures to control insects and diseases.	3.5
	f.	Know how to treat animals for diseases and insects.	2.8
4.	Have a knowledge of and be able to perform the following skills.		3.1
	a.	Understand and use good public relations.	3.9
	b.	Keep good records.	3.9
	c.	Understand the grades of milk.	3.7
	d.	Detect appearance and color of milk.	3.5
	e.	Microscopically identify foreign matter in milk.	2.9
	f.	Make bacterial counts.	2.6
	g.	Test for butterfat.	2.4
	h.	Test for diseases.	2.1

EGG INSPECTOR

Job Description:

An Egg Inspector determines proper classifications of eggs offered for sale that meet federal and state standards and requirements. The Egg Inspector makes sure eggs are properly graded and classed. He or she also explains and interprets laws governing grades of eggs for the public on the retail as well as wholesale levels. The Egg Inspector's duties require weighing, candling, checking packages for labeling, and initiating prosecution when necessary. The Inspector disseminates information to wholesalers and retailers on egg quality standards.

Competencies Identified and Validated

N = 34*

Competencies	Weighted Mean**
1. Weigh eggs.	3.9
a. Know weights for small, medium, large, extra large, and jumbo eggs.	3.9
b. Determine egg grades such as A, B, etc.	3.9
2. Candle eggs.	3.9
a. Check for meat spots.	4.0
b. Check for broken shells.	3.9
c. Check for blood spots.	3.9
d. Check for air bubbles.	3.7
3. Package eggs.	3.5
a. Check to make sure eggs are washed before packaging.	4.0
b. Check to make sure eggs are put into egg cartons correctly.	4.0
c. Check egg cartons for proper labeling.	3.7
d. Check egg cartons for insects.	3.1
e. Check to make sure egg cartons are put into egg case correctly.	2.6
4. Know state and federal regulations.	3.4
a. Know and understand state and federal regulations.	3.8
b. Interpret state and federal regulations for the wholesaler and retailer.	3.8

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* Responses from 34 Egg Inspectors in 26 states. Survey conducted by Department of Agricultural Education, North Carolina A & T State University, Greensboro, North Carolina 27411.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Interpret state and federal regulations for the public.	3.2
d.	Recommend ways to correct the error of the retailer and wholesaler.	3.2
e.	Recommend prosecution for enforcement of federal and state regulations.	3.0
5.	Check transportation procedures.	3.2
a.	Check to make sure the temperature for the shipment of eggs is within the correct range.	3.6
b.	Check to make sure the egg cases are handled correctly.	3.3
c.	Check to make sure egg cases are not stacked too high.	2.7
6.	Check storage procedures.	3.6
a.	Check to make sure eggs are stored at a proper temperature.	3.7
b.	Check to make sure eggs are not stored too long a period of time.	3.7
c.	Check to make sure eggs are not stored in the direct rays of the sun.	3.4
7.	Maintain public relations.	3.2
a.	Develop confidence in egg quality program and its enforcement.	3.5
b.	Discuss egg quality with the wholesaler and retailer.	3.3
c.	Maintain favorable public contacts.	3.2
d.	Discuss advantages of buying graded eggs to the public.	2.9
8.	Understand the operation and maintenance of egg inspection equipment.	3.0
a.	Know how to operate egg candler.	3.5
b.	Know proper temperature of water for egg cleaner.	3.4
c.	Know how to operate and maintain egg grader.	2.8
d.	Know how to operate egg cleaner.	2.6
e.	Know how to operate egg crater.	2.5

FRUIT AND VEGETABLE INSPECTOR

Job Description:

Persons involved in this occupation receive training qualifying them for employment as Fruit and Vegetable Inspectors, Plant Pest Controllers, and Disease Controllers. Duties may include inspection or regulatory work at shipping and terminal points; determination of grade, quality and condition of produce; observation of carriers and cargo at loading and sealing points; administration of certificates and records of inspection; explaining standards and procedures adopted by his bureau to growers and shippers; and reporting of violations. Other duties include inspecting crops for infestation by certain insects, locating areas of infection, mapping the area, and assisting in controlling or eradicating pests by spraying, removing host plants, or other approved methods.

Competencies Identified and Validated

N = 33*

Competencies		Weighted Mean**
1.	Have general knowledge of fruits and vegetables.	3.8
a.	Types of fruits and vegetables.	3.6
b.	Structure.	3.2
c.	Growth.	3.0
2.	Have general knowledge of insects and their control.	3.4
a.	Type of insects.	3.2
b.	Type of insecticides.	3.2
c.	When to use insecticides.	3.1
d.	Method of application.	3.0
e.	Life span.	2.9
f.	Egg laying stage.	2.9
3.	Have general knowledge of diseases and their control.	3.1
a.	Types of diseases.	3.4
b.	Part of the plant affected by the disease.	3.2
c.	When the diseases occur.	3.2
d.	Type of pesticides.	3.0
e.	When to use pesticides.	3.0
f.	Method of application.	2.9

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* Responses from 33 Fruit and Vegetable Inspectors in 26 states. Survey conducted by Department of Agricultural Education, North Carolina A & T State University, Greensboro, North Carolina 27411.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4.	Have knowledge of weeds and their controls.	2.5
a.	Characteristics of a herbicide.	2.8
b.	Reproduction of weeds by seed.	2.4
c.	Reproduction of weeds by vegetative reproduction.	2.4
5.	Possess additional understandings and skills.	2.8
a.	Know the grades of fruits and vegetables.	3.6
b.	Have a knowledge of Federal, state, and local regulations concerning sanitation, purity, and grading of fruits and vegetables.	3.5
c.	Grade fruits and vegetables.	3.5
d.	Check for correct packaging.	3.5
e.	Make sure fruits and vegetables are packaged correctly.	3.4
f.	Know the proper temperature range for storage of fruits and vegetables.	3.3
g.	Know and understand the climatic factors and their effect on the plants.	3.3
h.	Collect samples for laboratory.	3.2
i.	Collect evidence for prosecuting violators.	3.2
j.	Check for proper displaying of permits and licenses.	3.2
k.	Use specialized test equipment such as ultraviolet light and filter guns.	3.2
l.	Make sure fruits and vegetables are washed correctly.	3.2
m.	Know sanitation in processing.	3.1
n.	Know the kinds of microbiological life found in relation to fruit processing.	2.9
o.	Understand the method of sorting fruits.	2.9
p.	Know how to operate appropriate equipment.	2.8
q.	Understand the purposes and principles of spraying.	2.8
r.	Understand the importance of knowing food values.	2.7
s.	Understand the factors determining the use to be made of fruit.	2.7
t.	Understand the principles of fruit preservation.	2.6
u.	Know the effect of processing and preparation upon food value.	2.5
v.	Understand the purposes and principles of thinning.	2.4
w.	Understand the purposes and principles of frost protection.	2.4
x.	Understand the production factors affecting processed fruit.	2.4
y.	Understand the utilization of processed fruit.	2.4
z.	Understand the principles of scalding and blanching.	2.3

aa.	Understand the methods of canning.	2.3
bb.	Understand the methods of bottling and canning fruit juics.	2.3
cc.	Understand the principles involved in freezing.	2.3
dd.	Understand the purpose of pollination.	2.2
ee.	Understand the principles of peeling, cutting, and pitting.	2.2
ff.	Understand the purpose of using bees for pollination.	2.0

POULTRY INSPECTOR

Job Description:

This person inspects dressed poultry according to U. S. Department of Agriculture grades; inspects live birds for diseases and general appearance; and inspects production facilities and processing plants for proper sanitation. He or she inspects wholesale and retail outlets to make sure they abide by federal, state and local regulations. Inspectors advise prosecution for companies which are in violation. They destroy birds which do not make the grade and make reports to supervisors.

Competencies Identified and Validated

N = 30*

Competencies		Weighted Mean**
1.	Have general knowledge of the poultry industry.	3.0
a.	Type of poultry.	3.3
b.	Know which are white and which are dark meats.	3.2
c.	Know importance of poultry as an agricultural enterprise.	2.8
d.	Know average medium weights per bird.	2.7
2.	Have knowledge of poultry nutrition.	1.8
a.	Knowledge of poultry anatomy.	2.8
b.	Knowledge of mixing rations.	2.1
c.	Knowledge of percent protein in rations.	1.9
d.	Knowledge of carbohydrates in rations.	1.9
e.	Knowledge of vitamins in rations.	1.8
f.	Knowledge of the costs of rations.	1.6
g.	Knowledge of fiber content of rations.	1.6
h.	Knowledge of fat content in rations.	1.6
i.	Knowledge of mineral content in rations.	1.5
3.	Have knowledge of poultry health, diseases, and parasites and their control.	2.8
a.	Knowledge of vaccination program for poultry.	3.2
b.	Knowledge of disinfectants and their use.	2.8
c.	Knowledge of insecticides and their use.	2.8
d.	Knowledge of preventative medicine.	2.7
e.	Understand sanitation for poultry.	2.4

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* Responses from 30 Poultry Inspectors in 23 states. Survey conducted by Department of Agricultural Education, North Carolina A & T State University, Greensboro, North Carolina 27411.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4.	Have knowledge of egg production.	2.2
a.	Knowledge and usage of culling.	2.4
b.	Knowledge of molting.	2.2
c.	Production of egg by hen.	2.0
d.	General appearance of bird.	2.0
5.	Have knowledge of breeding.	2.0
a.	Knowledge of general appearance.	2.6
b.	Knowledge of genetics.	2.0
c.	Knowledge of gestation period.	2.0
d.	Knowledge of the humidity requirements of eggs for hatching.	2.0
e.	Knowledge of egg temperature for hatching.	1.8
f.	Knowledge of broodiness of fowl.	1.8
6.	Know processing operations.	3.2
a.	Knowledge of the appearance of diseased dressed bird.	3.8
b.	Knowledge of the appearance of the healthy dressed bird.	3.6
c.	Knowledge of the different types.	3.6
d.	Knowledge of state, federal, and local health regulations concerning poultry.	3.6
e.	Know the grades of poultry.	3.4
f.	Knowledge of bird disection.	3.4
g.	Knowledge of the machinery used in the processing plant.	3.3
h.	Knowledge of the temperature and time needed for scalding the bird.	3.0
i.	Knowledge of cost factors affecting processing.	2.8
j.	Knowledge of the ways to kill the poultry.	2.8
k.	Knowledge of the different types of meat on the bird.	2.5
7.	Understand proper storage procedures.	3.6
a.	Knowledge of correct temperature range.	3.7
b.	Knowledge and identification of freezer burn.	3.6
c.	Knowledge of the appearance of the dressed bird.	3.6
8.	Have an understanding of marketing procedures and regulations.	2.8
a.	Interpretation of federal and state regulations to the retailer.	3.5
b.	Interpretation of federal and state regulations to the wholesaler.	3.4
c.	Knowledge of federal, state, and local health regulations concerning poultry.	3.4
d.	Knowledge of retail operations.	2.6
e.	Knowledge of wholesale operations.	2.4
f.	Knowledge of supply and demand.	2.3
g.	Knowledge of cost factors.	2.2

MILK TESTER

Job Description:

The individual performs tests in determining the quantity and/or quality of physical and/or chemical properties in milk and ensures compliance with company and government standards. The Tester is competent in using appropriate laboratory and office equipment. This person may travel from farm to farm to make designated tests.

Competencies Identified and Validated

N = 50*

Competencies		Weighted Mean**
1.	Have knowledge of milk composition and computation.	3.0
a.	Butterfat content.	3.7
b.	Solids not fat (SNF).	3.5
c.	Water percentage.	3.4
d.	Mineral content.	2.4
e.	Vitamin D content.	2.2
2.	Have general knowledge of the dairy industry.	3.0
a.	Production problems associated with handling milk.	3.3
b.	Milk storage.	3.2
c.	Grade of milk.	3.0
d.	Milk transportation.	2.9
e.	Marketing to wholesalers and retailers.	2.4
3.	Know sanitation regulations.	3.0
a.	Know Federal and State regulations.	3.4
b.	Know disease carrying organisms found in milk.	3.1
c.	Be familiar with local board of health regulations.	3.0
d.	Know pasteurization methods.	2.8
e.	Know preventive procedures to control disease and insects.	2.6
4.	Possess various milk testing skills.	3.4
a.	Operate centrifuges and other equipment.	3.6
b.	Operate microscope.	3.5
c.	Detect the aroma of milk.	3.5
d.	Test for non-fat solids.	3.5

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* Responses from 50 Milk Testers in 33 states. Survey conducted by Department of Agricultural Education, North Carolina A & T State University, Greensboro, North Carolina 27411.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

e.	Test for cream.	3.5
f.	Test for butterfat.	3.5
g.	Test for acidity.	3.4
h.	Make bacterial counts.	3.3
i.	Test for alkalinity.	3.2
j.	Test for salt content.	2.8

ANIMAL HEALTH ASSISTANT

Other Titles: Veterinary-Hospital Attendant, Veterinary Assistant.

Job Description:

The Animal Health Assistant is responsible for the care of animals under treatment in animal hospital for disease, injury, or for production of serums; leads, wheels, or carries animal from quarters to treatment room; lifts animal onto treatment table and applies restraints or holds it during treatment; sterilizes surgical instruments and other special equipment, such as rubber gloves, syringes, and test tubes, using germicides and autoclave; administers anesthetic, medications, and prescribed nursing care, under direction of veterinarian; measures, mixes, grinds, and chops specified ingredients to prepare food, and feeds animals. Bathes and brushes animals, and clips their nails. Sweeps, dusts, mops, and hoses hospital rooms and animal quarters. May receive clients, answer telephone, make appointments, and accept payment on accounts.

Competencies Identified and Validated

N = 43*

Competencies		Weighted Mean**
1.	Perform general office work.	3.3
a.	Use telephone.	3.7
b.	Wear appropriate dress for office work.	3.5
c.	Greet clients and customers.	3.5
d.	File X-rays.	3.4
e.	Admit and dismiss patients.	3.3
f.	File office forms and records.	3.3
g.	Schedule appointments.	3.3
h.	Determine purpose of visits.	3.2
i.	Operate office equipment.	3.0
j.	Write notes, memos, and letters.	3.0
k.	Notify clients of appointments.	2.8
2.	Record information.	3.2
a.	Record vaccination information.	3.6
b.	Record medication information.	3.5
c.	Record patient information.	3.4

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* Responses from 43 Animal Health Assistants in 20 states. Survey conducted by Department of Agricultural Education, The Ohio State University, Columbus, Ohio 43210.

** 4.0 = Essential; 3.0 = Important; 2-0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	d.	Record client information.	3.4
	e.	Record feeding information.	3.4
	f.	Record bowel movement.	3.4
	g.	Record surgery information.	3.3
	h.	Record weight information.	3.2
	i.	Receive payment.	3.0
	j.	Maintain account records and payments.	2.6
	k.	Balance daily cash statement.	2.4
3.	Handle and care for animals.		3.3
	a.	Control animals when handling.	3.8
	b.	Identify animals.	3.7
	c.	Observe animals for problems.	3.6
	d.	Place animals in pens.	3.5
	e.	Collect bowel movements.	3.4
	f.	Exercise animals.	3.3
	g.	Take pulse and temperature.	3.3
	h.	Separate noncompatible animals.	3.3
	i.	Identify animal heat signs.	3.2
	j.	Assist in delivering young.	3.2
	k.	Evaluate condition of animals.	3.1
	l.	Estimate weight of animals.	2.7
	m.	Induce bowel movements.	2.5
4.	Feed animals.		3.2
	a.	Add medication to feeds.	3.6
	b.	Provide water for animals.	3.5
	c.	Place feed in containers.	3.3
	d.	Prepare feed.	3.3
	e.	Determine amount of feed required by animals.	3.0
	f.	Interpret information on feed labels.	2.9
5.	Groom animals.		3.1
	a.	Clip nails.	3.4
	b.	Clean ears.	3.2
	c.	Bathe animals.	3.0
	d.	Clean teeth.	3.0
	e.	Comb animals.	2.8
	f.	Dry washed animals with towel and dryer.	2.8
6.	Perform examining room work.		3.6
	a.	Use appropriate disinfectants.	3.8
	b.	Place and restrain animals on examining table.	3.8
	c.	Preparing examination room area.	3.7
	d.	Disinfect examining table and equipment.	3.7
	e.	Identify external parasites.	3.5
	f.	Assist in treating disease.	3.3
7.	Perform laboratory tests.		3.5
	a.	Set up and adjust microscope.	3.6
	b.	Perform flotation method.	3.6

	c.	Operate centrifuge.	3.6
	d.	Identify parasites and eggs.	3.5
	e.	Analyze fecal samples.	3.5
	f.	Collect urine samples.	3.3
	g.	Chemically examine urine.	3.2
	h.	Perform CBC's. #	
	i.	Examine urinary sediment. #	
	j.	Innoculate media for bacterial cultures. #	
	k.	Perform blood serum tests and blood smears. #	
8.		Dispense medicine and supplies.	3.4
	a.	Maintain orderly storage shelves.	3.6
	b.	Measure exact amounts for prescriptions.	3.6
	c.	Store products in appropriate area.	3.6
	d.	Label drug containers.	3.4
	e.	Destroy empty containers.	3.2
	f.	Interpret prescriptions.	3.2
	g.	Transfer products to proper containers.	3.2
	h.	Interpret product labels.	3.0
9.		Administer medication.	3.4
	a.	Sterilize injection equipment.	3.8
	b.	Fill syringe.	3.8
	c.	Administer oral medication under supervision.	3.7
	d.	Administer surface medication under supervision.	3.5
	e.	Administer IM injections under supervision.	3.4
	f.	Administer subcutaneous injections under supervision.	3.3
	g.	Administer rectal medication under supervision.	3.0
	h.	Administer IV injections under supervision.	2.9
10.		Restrain animals.	3.7
	a.	Restrain animal's head.	3.9
	b.	Properly approach animal.	3.8
	c.	Open mouth.	3.8
	d.	Apply various muzzles.	3.8
	e.	Form temporary muzzles.	3.8
	f.	Identify animal moods.	3.7
	g.	Tie animal to table.	3.5
11.		Assist with X-rays.	3.4
	a.	Use appropriate aprons and gloves.	3.9
	b.	Use proper film.	3.6
	c.	Store X-rays.	3.5

# Not included on questionnaire but recommended by some experts surveyed.

d.	Develop film.	3.5
e.	Maintain water and solution temperatures.	3.4
f.	Position animal for X-rays.	3.4
g.	Remove film from cassette.	3.4
h.	Fix film.	3.4
i.	Adjust cassette holder.	3.3
j.	Identify normal X-ray procedures.	3.2
k.	Measure part of the animal to be examined.	3.2
l.	Mix and replace developing solution.	3.1
12.	Use and maintain small animal care equipment.	3.6
a.	Sterilize instruments and equipment.	3.9
b.	Clean and disinfect instruments and equipment.	3.8
c.	Identify anesthesiology equipment.	3.8
d.	Identify bandage and stitch scissors.	3.8
e.	Identify transfusion equipment.	3.7
f.	Identify various injection equipment.	3.7
g.	Identify various syringes.	3.7
h.	Identify various suture needles.	3.6
i.	Identify various hemostats.	3.6
j.	Identify various forceps.	3.6
k.	Identify catheters.	3.6
l.	Identify surgical blades and scalpels.	3.6
m.	Identify fracture equipment.	3.6
n.	Identify cauterizing equipment.	3.6
o.	Store instruments and equipment.	3.6
p.	Select appropriate equipment.	3.6
q.	Identify and use dental equipment.	3.5
r.	Identify scissor tips.	3.5
s.	Check equipment for defects.	3.4
t.	Identify canine tonsil snares.	3.3
u.	Identify post-mortem equipment.	3.3
13.	Prepare facilities and equipment for surgery.	3.6
a.	Clean surgical equipment.	3.8
b.	Lay out surgical equipment.	3.7
c.	Prepare standard and special surgical packs.	3.7
d.	Prepare sterile bundles and germicide basins.	3.6
e.	Prepare sterile gowns, caps and masks.	3.6
f.	Perform scrubbing technique.	3.5
14.	Prepare animals for surgery.	3.6
a.	Assist in anesthetizing animals.	3.7
b.	Clip animal hair.	3.6
c.	Shave animal.	3.6
d.	Wash animal.	3.6
e.	Wash operative area on animal.	3.6
f.	Drape and position animal.	3.5

15.	Perform emergency first aid.	3.5
	a. Identify shock symptoms.	3.6
	b. Apply minor medication.	3.6
	c. Apply antiseptic.	3.6
	d. Stop external bleeding.	3.6
	e. Cleanse wounds.	3.6
	f. Administer oxygen.	3.5
	g. Identify hemorrhaging symptoms.	3.5
	h. Maintain body temperature.	3.5
	i. Administer artificial respiration.	3.3
	j. Prepare patient for transfusion.	3.3
	k. Identify various internal bleeding.	2.9
16.	Inventory products.	3.2
	a. Remove expired products.	3.3
	b. Take physical inventory.	3.3
	c. Remove contaminated items.	3.3
	d. Order supplies.	2.9
17.	Sell and market products.	3.2
	a. Make change.	3.4
	b. Meet customers.	3.4
	c. Determine amount of product on hand.	3.4
	d. Stock shelves.	3.3
	e. Price products.	2.7
18.	Maintain facilities.	3.4
	a. Clean and disinfect pens.	3.5
	b. Clean feeders.	3.4
	c. Clean holding pens, cages, and runs.	3.4
	d. Clean waiting and grooming rooms.	3.4
	e. Dispose of residue and trash.	3.3
19.	Follow safety precautions.	3.7
	a. Follow safe work habits.	3.8
	b. Identify potential safety hazards.	3.7
	c. Store chemicals safely.	3.7
	d. Wear appropriate protective clothing.	3.7
	e. Administer minor first aid for cuts, bruises, burns, etc.	3.6
	f. Use fire extinguishers.	3.5

LABORATORY ANIMAL ASSISTANT

Other Titles: General Laboratory Helper, Animal Tender, Animal Caretaker, Animal Keeper.

Job Description:

Cares for laboratory animals such as rabbits, mice, rats, guinea pigs, dogs, and monkeys used in experimental biological and medical research; inspects animals for general appearance and counts animals when received to verify against purchase orders; weighs or measures, grinds, chops, and mixes specified quantities of ingredients to prepare animal food; feeds and waters animals as indicated by schedules and diet lists; records amount consumed; leads or carries animals between quarters, laboratories, and surgery; holds animals during injections; examines animals to detect signs of illness; adjusts controls to insure that temperature and humidity of animal's quarters are within specified limits; separates weaned animals from their mothers; segregates animals according to their breed, color, size, weight, and diet of animals for breeding purposes; places animals in containers for shipment; may innoculate animals with serums or antibiotics; cleans and sterilizes cages, pens, and surrounding areas, such as walls, windows, and floors, using steam or germicidal solutions; places portable cages in autoclave and sterilizes them; repairs cages and equipment using hand tools; sprays insecticides and spreads powder in animal quarters to exterminate insects; orders feed and supplies; may remove dead animals to incinerator for cremation.

Competencies Identified and Validated

N = 31*

	Competencies	Weighted Mean**
1.	Interpret medical terminology.	2.9
a.	Identify reproductive system and function.	3.2
b.	Identify major disease terminology.	3.1
c.	Identify general anatomy and physiology.	3.1
d.	Identify respiratory system and function.	2.8
e.	Identify urinary system and function.	2.7
f.	Identify circulatory system and function.	2.7
g.	Identify digestive system and function.	2.7
h.	Identify integumentary system and function.	2.7

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* Responses from 31 Laboratory Animal Assistants in 20 states. Survey conducted by Department of Agricultural Education, The Ohio State University, Columbus, Ohio 43210.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.		Record information.	3.2
	a.	Record weight information.	3.5
	b.	Record height information.	3.5
	c.	Record medication information.	3.3
	d.	Record patient information.	3.3
	e.	Record feeding information.	3.2
	f.	Record surgery information.	3.2
	g.	Record water information.	3.1
	h.	Record vaccination information.	3.0
	i.	Record bowel movement.	2.9
	j.	Record heat cycle for breeding stock.	2.8
	k.	Record phenotype of animals where more than one is possible. #	
3.		Handle and care for animals.	3.1
	a.	Identify animals.	3.8
	b.	Observe animals regularly for problems.	3.8
	c.	Evaluate condition of animals.	3.7
	d.	Sex animals.	3.6
	e.	Tag animals.	3.6
	f.	Separate noncompatible animals.	3.5
	g.	Weigh animals.	3.4
	h.	Assist in quarantine procedures.	3.4
	i.	Regulate air movement and temperature in holding areas.	3.3
	j.	Place animals in pens.	3.1
	k.	Provide proper environment for bred animals.	3.0
	l.	Check if animals are pregnant.	2.9
	m.	Estimate weight of animals.	2.9
	n.	Identify animal heat signs.	2.8
	o.	Take pulse and temperature.	2.7
	p.	Assist animals in nursing.	2.3
	q.	Induce bowel movements.	1.6
4.		Feed animals.	3.0
	a.	Provide water for animals.	3.6
	b.	Place feed in containers.	3.4
	c.	Prepare feed.	3.1
	d.	Determine how often animals should be fed.	3.0
	e.	Determine amount of feed required by animals.	3.0
	f.	Add medication to feeds.	2.9
	g.	Determine when to feed.	2.9
	h.	Identify information on feed labels.	2.8
	i.	Determine nutritional requirement of animals.	2.8
	j.	Determine which feeds may be fed animals .	2.7
5.		Perform laboratory tests.	2.7
	a.	Take blood samples.	3.3
	b.	Collect urine samples.	2.8

# Not included on questionnaire but recommended by some experts surveyed.

	c.	Measure solids and liquids.	2.7
	d.	Convert English measurement to metric measurement.	2.7
	e.	Chemically examine urine.	2.1
	f.	Identify internal and external parasites. #	
6.	Dispense medicine and supplies.		3.1
	a.	Store products in appropriate area.	3.5
	b.	Maintain orderly storage shelves.	3.4
	c.	Destroy empty containers and drug administration devices.	3.3
	d.	Transfer products to proper containers.	3.3
	e.	Measure exact amounts for prescriptions.	3.2
	f.	Interpret product labels.	2.9
	g.	Label drug containers.	2.9
	h.	Prepare animal drug forms.	2.6
	i.	Interpret prescription requests.	2.5
7.	Administer medication.		3.0
	a.	Administer oral medication under supervision.	3.2
	b.	Administer subcutaneous injections under supervision.	3.2
	c.	Fill syringe.	3.2
	d.	Locate injection points on animals under supervision.	3.2
	e.	Sterilize injection equipment.	3.1
	f.	Administer surface medication under supervision.	3.1
	g.	Administer IM injections under supervision.	3.1
	h.	Select proper needles.	3.0
	i.	Administer IV injections under supervision.	3.0
	j.	Interpret veterinarian medication prescription.	2.9
	k.	Administer rectal medication under supervision.	2.8
	l.	Identify and select animals proper medication.	2.5
	m.	Administer injections asceptically. #	
8.	Restrain animals.		3.0
	a.	Properly approach animals.	3.5
	b.	Restrain animal's head.	3.4
	c.	Operate restraining mechanisms.	3.1
	d.	Form temporary muzzles.	3.0
	e.	Identify animal moods.	2.9
	f.	Open mouth.	2.8
	g.	Tie animal to table.	2.8
	h.	Tape legs.	2.7

# Not included on questionnaire but recommended by some experts surveyed.

9.	Assist with X-rays.	2.0
a.	Measure part of animal to be examined.	2.0
10.	Use and maintain small animal care equipment.	2.9
a.	Clean and disinfect instruments and equipment.	3.7
b.	Sterilize instruments and equipment.	3.4
c.	Use and maintain various scales and balances.	3.3
d.	Interpret equipment operation instructions.	3.2
e.	Check equipment for defects.	3.2
f.	Select appropriate equipment.	3.1
g.	Store instruments and equipment.	3.1
h.	Identify various syringes.	3.1
i.	Maintain air cleaners.	2.9
j.	Identify various injection equipment.	2.9
k.	Identify transfusion equipment.	2.6
l.	Identify catheters.	2.6
m.	Identify various forceps.	2.6
n.	Identify various hemostats.	2.5
o.	Identify scissor tips.	2.5
p.	Identify and use nail files.	2.2
q.	Identify and use rake.	2.0
11.	Prepare facilities and equipment for surgery.	3.1
a.	Clean surgical equipment.	3.3
b.	Perform scrubbing technique.	3.2
c.	Prepare sterile gowns, caps, and masks.	2.9
12.	Prepare animals for surgery.	3.1
a.	Clip animal hair.	3.3
b.	Shave animal.	3.2
c.	Assist in anesthetizing animal.	3.1
d.	Drape and position animal.	3.0
13.	Perform emergency first aid.	2.8
a.	Identify internal hemorrhaging symptoms.	3.4
b.	Apply minor medication.	3.2
c.	Apply antiseptic.	3.1
d.	Cleanse wounds.	3.1
e.	Identify various external bleeding.	3.0
f.	Isolate suspected rabid animals.	3.0
g.	Stop external bleeding.	2.9
h.	Identify shock symptoms.	2.8
i.	Maintain body temperature.	2.8
j.	Prepare and transport emergency victims.	2.6
k.	Administer artificial respiration.	2.4
l.	Administer oxygen.	2.4
m.	Prepare patient for transfusion.	2.1
14.	Inventory products.	3.1
a.	Remove contaminated items.	3.4
b.	Remove expired products.	3.3
c.	Take physical inventory.	3.1

d.	Order supplies.	3.0
e.	Use stocking forms.	2.8
15.	Follow legal regulations.	2.9
a.	Determine what duties may be performed.	2.9
16.	Maintain facilities.	3.5
a.	Clean feeders.	3.6
b.	Clean holding pens, cages, and runs.	3.6
c.	Clean and disinfect pens.	3.5
d.	Dispose of residue and trash.	3.5
e.	Clean waiting and grooming rooms.	3.3
f.	Maintain automatic watering system.	3.3
17.	Follow safety precautions.	3.6
a.	Follow safe work habits.	3.9
b.	Identify potential safety hazards.	3.7
c.	Wear appropriate protective clothing.	3.7
d.	Store chemicals safely.	3.6
e.	Use fire extinguisher.	3.4
f.	Administer minor first aid for cuts, bruises, burns, etc.	3.3
18.	Perform post surgical care.	3.1
a.	Record abnormal behavior.	3.3
b.	Identify shock symptoms.	3.0
c.	Maintain body heat.	2.9
19.	Perform euthanasia methods.	3.2
a.	Identify method for specific species.	3.3
b.	Perform euthanasia procedures.	3.1

PET SHOP WORKER

Other Titles: Pet Shop Attendant, Aquarist, Aquarium Tankman, Tank Attendant, Tankman.

Job Description:

Cares for birds and animals and fish in a pet shop; feeds and waters birds and animals by replenishing troughs; cleans pens and cages, using scraper and shovel; observes birds and animals for signs of sickness or injury; transfers birds and animals from one cage to another, or removes them according to customer selection, manually or by use of a net. The Pet Shop Worker attends to fish and other marine life; prepares food or special diets for and feeds fish; cleans bottom and clears away algae on windows of tanks, using scrubbing brushes; attends to marine plants and decorations used in live tank displays; observes and reports diseased, injured, or dead fish; gives medical treatments to and provides other necessities for fish as directed; may record number and kinds of fish for inventory purposes.

Competencies Identified and Validated

N = 25*

Competencies	Weighted Mean**
1. Perform general office work.	2.7
a. Greet clients and customers.	3.7
b. Use telephone.	3.7
c. Wear appropriate dress for office work.	3.1
d. Write notes, memos, and letters.	2.9
e. Manage bad checks.	2.6
f. Determine purpose of visits.	2.4
g. File office forms and records.	2.2
h. Schedule appointments.	2.1
i. Operate office equipment.	2.0
2. Record information.	2.9
a. Record feeding information.	3.5
b. Record medication information.	3.4
c. Maintain animal loss record.	3.1
d. Maintain animal transfer record.	3.0
e. Record vaccination information.	3.0

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* Responses from 25 Pet Shop Workers in 20 states. Survey conducted by Department of Agricultural Education, The Ohio State University, Columbus, Ohio 43210.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Record patient information.	3.0
	g.	Balance daily cash statements.	3.0
	h.	Record client information.	3.0
	i.	Record personal accidents.	2.9
	j.	Deposit daily receipts.	2.8
	k.	Record weight information.	2.8
	l.	Record account data.	2.8
	m.	Record surgery information.	2.7
	n.	Prepare monthly bank statement.	2.7
	o.	Maintain account records and payments.	2.7
	p.	Receive payment.	2.6
	q.	Maintain personnel work hours chart.	2.6
	r.	Write checks.	2.1
3.	Handle and care for animals.		3.2
	a.	Implement and maintain sanitary procedures.	3.7
	b.	Maintain sanitary environment for young.	3.6
	c.	Separate noncompatible animals.	3.6
	d.	Observe animals regularly for problems.	3.6
	e.	Estimate weight of animals.	3.5
	f.	Evaluate condition of animals.	3.5
	g.	Control animals when handling.	3.4
	h.	Place animals in pens.	3.3
	i.	Provide proper environment for bred animals.	3.2
	j.	Exercise animals.	3.1
	k.	Identify husbandry practices of rodents.	3.1
	l.	Isolate pregnant animals.	3.1
	m.	Tag animals.	3.1
	n.	Identify husbandry practices or parakeet varieties.	3.0
	o.	Identify husbandry practices of lovebirds and cockateels.	3.0
	p.	Identify husbandry practices of parrots and macaws.	2.9
	q.	Check if animals are pregnant.	2.8
	r.	Identify breeding methods.	2.7
	s.	Play with animals.	2.6
	t.	Identify animal heat signs.	2.6
4.	Feed animals.		3.0
	a.	Provide water for animals.	3.8
	b.	Place feed in containers.	3.3
	c.	Prepare feed.	3.2
	d.	Add medication to feeds.	3.2
	e.	Feed pre/post shipment diet.	3.1
	f.	Determine amount of feed required by animals.	3.0
	g.	Determine nutritional requirement of animals.	2.9
	h.	Determine how often animals should be fed.	2.9
	i.	Determine when to feed.	2.9
	j.	Determine common nutritional principles.	2.9
	k.	Determine which feeds may be fed animals.	2.9
	l.	Identify common storage procedures.	2.8
	m.	Identify information on feed labels.	2.6

	n.	Identify components of feed.	2.5
5.		Groom animals.	2.0
	a.	Dry washed animals with towel and dryer.	2.4
	b.	Comb animals.	2.2
	c.	Identify water and shampoo differences.	2.2
	d.	Clip nails.	2.0
	e.	Pluck hair.	1.7
	f.	Perfume animals.	1.5
6.		Perform examining room work.	2.0
	a.	Use appropriate disinfectants.	2.6
	b.	Assist in treating disease.	2.0
	c.	Assist manager in determining control procedures.	2.0
	d.	Place and restrain animal on examining table.	1.8
	e.	Prepare examination room area.	1.8
	f.	Use proper taping techniques.	1.8
7.		Perform laboratory tests.	2.3
	a.	Measure solids and liquids.	2.3
	b.	Identify parasites and eggs.	2.2
8.		Dispense medicine and supplies.	2.7
	a.	Destroy empty containers and drug administration devices.	2.8
	b.	Store products in appropriate area.	2.8
	c.	Interpret product labels.	2.6
	d.	Label drug containers.	2.6
	e.	Transfer products to proper containers.	2.6
9.		Perform emergency first aid.	3.0
	a.	Isolate abnormal animals.	3.1
	b.	Maintain body temperature.	3.0
	c.	Cleanse wounds.	2.9
	d.	Apply antiseptic.	2.8
10.		Inventory products.	3.0
	a.	Remove contaminated items.	3.4
	b.	Order supplies.	3.0
	c.	Take physical inventory.	3.0
	d.	Remove expired products.	3.0
	e.	Use stocking forms.	2.7
11.		Sell and market products.	3.3
	a.	Complete sales slip.	3.6
	b.	Initiate sales.	3.6
	c.	Demonstrate items for sale.	3.5
	d.	Handle customer inquiries and complaints.	3.5
	e.	Make change.	3.4
	f.	Operate cash register.	3.4

	g.	Determine whether product requested is on hand.	3.4
	h.	Price products.	3.2
	i.	Prepare newspaper, newsletter, and other written public advertisements.	2.3
12.	Follow legal regulations.		3.0
	a.	Demonstrate knowledge of animal health care regulations.	3.2
	b.	Demonstrate knowledge of state laws.	3.0
	c.	Understand the legal rights and privileges of personnel.	3.0
	d.	Be aware of federal, state, and local lobby organizations.	3.0
	e.	Determine what duties may be performed.	2.9
	f.	Demonstrate knowledge of laws regulating pet supply companies.	2.9
	g.	Be aware of agencies available for legal help.	2.9
	h.	Determine which materials may be sold without prescriptions.	2.8
13.	Maintain facilities.		3.7
	a.	Clean feeders.	3.7
	b.	Clean waterers.	3.7
	c.	Clean and disinfect pens.	3.7
	d.	Dispose of residue and trash.	3.7
14.	Follow safety precautions.		3.6
	a.	Identify potential safety hazards.	3.7
	b.	Store chemicals safely.	3.7
	c.	Follow safe work habits.	3.6
	d.	Use fire extinguishers.	3.6
	e.	Administer minor first aid for cuts, bruises, burns, etc.	3.5
15.	Order tropical fish.		2.8
	a.	Identify disease and bacteria found in fresh water aquariums.	3.0
	b.	Determine number of tanks to be prepared for new fish orders.	2.8
	c.	Inventory and order fish.	2.6
	d.	Determine retail amounts of tropical fish ordered.	2.6
16.	Merchandise fish.		3.0
	a.	Identify fish.	3.2
	b.	Display speciality fish properly.	3.1
	c.	Place fish in proper tanks.	3.0
	d.	Select and use appropriate gravel for types of fish to be displayed.	3.0
	e.	Properly set up and display fish.	3.0

	f.	Use proper lighting for display fish.	2.9
	g.	Select proper background and ornaments for display fish.	2.9
	h.	Display top and bottom swimming fish appropriately.	2.8
17.	Receive and handle tropical fish.		3.3
	a.	Acclimate newly received fish.	3.3
	b.	Unpack delicate fish.	3.3

KENNEL WORKER

Other Titles: Dog Care Man, Dog Handler, Kennelman.

Job Description:

The Kennel Worker is responsible for attending to dogs in kennel; cleans kennels and rebeds dog pens, using brushes and disinfectant solutions; washes dogs and grooms and trims them for exhibition, using hand brushes, clippers, combs, and scissors; weighs and mixes specified amounts of feeds, and fills feed and water troughs; observes dogs to detect sickness and presence of disease; may regulate temperature and ventilation in kennel; may exercise dogs on treadmills; may maintain feed and breeding records; may assist in training dogs for hunting, guiding, and track.

Competencies Identified and Validated

N = 30*

Competencies			Weighted Mean**
1.	Perform general office work.		2.1
	a.	Admit and dismiss patients.	3.0
	b.	Determine purpose of visit.	2.9
	c.	Write memos, notes, and letters.	2.0
	d.	Greet clients and customers.	1.9
	e.	Use telephone.	1.9
	f.	File office forms and records.	1.7
	g.	Schedule appointments.	1.6
	h.	Wear appropriate dress for office work.	1.6
	i.	Handle client inquiries. #	
2.	Record information.		3.1
	a.	Record vaccination information.	3.4
	b.	Record feeding information.	3.4
	c.	Record client information.	3.4
	d.	Record patient information.	3.4
	e.	Record medication information.	3.3
	f.	Record pedigree records.	3.3
	g.	Record weight information.	3.3
	h.	Maintain account records and payments.	3.0
	i.	Deposit daily receipts.	2.9
	j.	Balance daily cash statement.	2.7

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* Responses from 30 Kennel Workers in 20 states. Survey conducted by Department of Agricultural Education, The Ohio State University, Columbus, Ohio 43210.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

# Not included on questionnaire but recommended by some experts surveyed.

	k.	Record bowel movement.	2.7
	l.	Receive payment.	2.5
	m.	Record breeding information. #	
	n.	Record growth data. #	
3.		Handle and care for animals.	3.0
	a.	Assist animals in nursing.	3.6
	b.	Assist animals in delivering young.	3.5
	c.	Collect bowel movements.	3.5
	d.	Control animals when handling.	3.5
	e.	Exercise animals.	3.0
	f.	Induce bowel movements.	3.0
	g.	Identify animal heat signs.	2.9
	h.	Identify breeding methods.	2.9
	i.	Observe animals regularly for problems.	2.9
	j.	Separate noncompatible animals.	2.9
	k.	Take pulse and temperature.	2.9
	l.	Check if animals are pregnant.	2.9
	m.	Estimate weight of animals.	2.8
	n.	Place animals in pens.	2.8
	o.	Identify animals.	2.5
	p.	Provide proper environment for bred animals.	2.4
	q.	Regulate air movement and temperature in holding areas.	2.4
4.		Feed animals.	3.5
	a.	Provide water for animals.	3.7
	b.	Prepare feed.	3.6
	c.	Place feed in containers.	3.6
	d.	Determine when to feed animals.	3.6
	e.	Determine amount feed required by animals.	3.6
	f.	Determine how often animals should be fed.	3.6
	g.	Determine nutritional requirement of animals.	3.5
	h.	Determine which feeds may be fed animals.	3.5
	i.	Identify information on feed labels.	3.5
	j.	Interpret nutritional feed charts.	3.4
	k.	Add medication to feeds.	2.5
	l.	Record and dispose of uneaten feed.#	
5.		Groom animals.	1.3
	a.	Bathe animals.	3.5
	b.	Clean ears.	0.9
	c.	Clip nails.	0.9
	d.	Comb animals.	0.9
	e.	Dry washed animal with towel and dryer.	0.9
	f.	Drain anal sacs.	0.7
	g.	Determine proper type of shampoo, rinse, and dip to use. #	
	h.	Handle and use clippers properly. #	

# Not included on questionnaire but recommended by some experts surveyed.

6.	Perform examining room work.		0.7
	a.	Use appropriate disinfectants.	1.0
	b.	Identify external parasites.	0.9
	c.	Change bandages.	0.8
	d.	Assist in treating disease.	0.8
	e.	Apply bandages.	0.7
	f.	Assist manager in determining control procedures.	0.7
	g.	Assist in diagnosing infectious and non-infectious diseases.	0.3
7.	Perform laboratory tests.		0.5
	a.	Measure solids and liquids.	0.5
	b.	Determine internal parasites from fecal samples. #	
8.	Dispense medicine and supplies.		2.1
	a.	Label drug containers.	3.6
	b.	Transfer products to proper containers.	2.8
	c.	Maintain orderly storage shelves.	2.7
	d.	Store products in appropriate area.	2.6
	e.	Interpret product labels.	1.5
	f.	Destroy empty containers and drug administering devices.	0.9
	g.	Interpret prescription request.	0.7
9.	Administer medication.		1.9
	a.	Administer oral medication under supervision.	3.4
	b.	Interpret vet medication prescriptions.	1.4
	c.	Administer surface medication under supervision.	0.9
10.	Restrain animals.		1.7
	a.	Restrain animal's head.	3.2
	b.	Properly approach animal.	3.1
	c.	Open mouth.	1.2
	d.	Identify animal moods.	1.1
	e.	Form temporary muzzles.	0.9
	f.	Apply various muzzles.	0.9
11.	Assist with X-rays.		2.6
	a.	Identify film development problems.	2.9
	b.	Develop film.	2.9
	c.	Clean processing tanks.	2.7
	d.	Identify developing chemicals.	2.7

# Not included on questionnaire but recommended by some experts surveyed.

	e.	Adjust settings.	2.5
	f.	Fix film.	2.1
12.		Use and maintain small animal care equipment.	2.8
	a.	Store instruments and equipment.	2.9
	b.	Check equipment for defects.	2.8
	c.	Clean and disinfect instruments and equipment.	2.7
13.		Show animals.	3.1
	a.	Register animals for show.	3.1
	b.	Assist in showing animals.	3.1
	c.	Train dogs for show. #	
14.		Perform emergency first aid.	3.5
	a.	Apply antiseptic.	3.7
	b.	Apply minor medication.	3.6
	c.	Identify internal hemorraging symptoms.	3.5
	d.	Identify and stop various external bleeding.	3.5
	e.	Prepare and transport emergency victims.	3.5
	f.	Maintain body temperature.	3.5
	g.	Isolate abnormal animals.	3.4
	h.	Cleanse wounds.	3.3
	i.	Identify shock symptoms.	3.2
	j.	Immobilize fractured limbs. #	
15.		Inventory products.	3.3
	a.	Remove expired products.	3.6
	b.	Use stocking forms.	3.4
	c.	Remove contaminated items.	3.4
	d.	Take physical inventory.	3.0
	e.	Order supplies.	3.0
16.		Sell and market products.	3.3
	a.	Handle customer inquiries and complaints.	3.5
	b.	Complete sales slip.	3.4
	c.	Determine whether product requested is on hand.	3.4
	d.	Make change.	3.4
	e.	Demonstrate items for sale.	3.3
	f.	Arrange displays.	3.3
	g.	Stock shelves.	3.3
	h.	Price products.	3.2
	i.	Meet customers.	2.9
17.		Follow legal regulations.	3.1
	a.	Determine which materials may be sold without prescription.	3.2

# Not included on questionnaire but recommended by some experts surveyed.

	b. Determine what duties may be performed.	2.9
18.	Maintain facilities.	3.5
	a. Clean feeders.	3.6
	b. Dispose of residue and trash.	3.5
	c. Clean holding pens, cages, and runs.	3.4
	d. Clean waiting and grooming rooms.	3.4
	e. Clean and disinfect pens.	3.4
	f. Repair fencing and latches. #	
19.	Follow safety precautions.	3.4
	a. Use fire extinguishers.	3.7
	b. Wear appropriate protective clothing.	3.5
	c. Store chemicals safely.	3.5
	d. Identify potential safety hazards.	3.4
	e. Follow safe work habits.	3.2
	f. Administer minor first aid for cuts, bruises, burns, etc.	3.2
	g. Use chemicals safely. #	

# Not included on questionnaire but recommended by some experts surveyed.

DOG GROOMER

Other titles: Dog Bather, Dog Beautician, Dog Hair-Clipper.

Job Description:

The Dog Groomer is responsible for performing the following duties to groom dogs: regulates bath water temperature by adjusting valves to control flow of hot and cold water, washes dogs with perfumed soap or shampoo solution, using handbrush, repeats washing until dog is clean and free of body odor; dries dog using towel and electric drier; trims and shapes dog's hair and toe nails, using scissors and clippers; cleans animal's quarters.

Competencies Identified and Validated

N = 31*

Competencies		Weighted Mean**
1.	Perform general office work.	3.0
a.	Greet clients and customers.	3.7
b.	Schedule appointments.	3.6
c.	Use telephone.	3.5
d.	Notify clients of appointments.	3.2
e.	Admit and dismiss patients.	3.0
f.	Determine purpose of visit.	3.0
g.	Wear appropriate dress for office work.	2.7
h.	File office forms and records.	2.5
i.	Operate office equipment.	2.3
j.	Write memos, notes, and letters.	2.2
2.	Record information.	3.0
a.	Record client information.	3.3
b.	Record medical information.	3.3
c.	Record patient information.	2.6
3.	Handle and care for animals.	3.6
a.	Control animals when handling.	3.9
b.	Separate noncompatible animals.	3.9
c.	Evaluate condition of animals.	3.8
d.	Regulate air movement and temperature in holding areas.	3.6
e.	Place animal on grooming table.	3.6
f.	Identify animals.	3.5

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* Responses from 31 Dog Groomers in 5 states. Survey conducted by Department of Agricultural Education, The Ohio State University, Columbus, Ohio 43210.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	g.	Place animals in pens.	3.4
	h.	Identify heat signs of animals.	3.3
4.		Feed animals.	2.3
	a.	Provide water for animals.	3.1
	b.	Prepare feed.	1.9
	c.	Place feed in containers.	1.9
5.		Groom animals.	3.4
	a.	Clean ears.	3.9
	b.	Clip nails.	3.9
	c.	Comb animals.	3.9
	d.	Identify clipping problems.	3.9
	e.	Perform various scissoring patterns.	3.8
	f.	Perform various clipping patterns.	3.8
	g.	Bathe animals.	3.8
	h.	Dry washed animal with towel and dryer.	3.7
	i.	Identify water and shampoo differences.	3.5
	j.	Perform post clipping procedures.	3.5
	k.	Drain anal sacs.	3.3
	l.	Pluck hair.	3.1
	m.	Perform various stripping patterns.	2.9
	n.	Perfume animals.	2.7
	o.	Paint nails.	2.2
	p.	Clean teeth.	1.9
	q.	Determine heat of clipper and blade at all times.#	
6.		Restrain animals.	3.4
	a.	Properly approach animal.	3.7
	b.	Restrain animal's head.	3.5
	c.	Identify animal moods.	3.5
	d.	Form temporary muzzles.	3.4
	e.	Apply various muzzles.	3.3
	f.	Open mouth.	3.0
7.		Use and maintain small animal care equipment.	3.5
	a.	Clean and disinfect instruments and equipment.	3.9
	b.	Identify and use clipper head.	3.9
	c.	Identify and use various scissors.	3.9
	d.	Identify and use brushes.	3.9
	e.	Identify and use nail clippers.	3.9
	f.	Use and maintain clippers.	3.9
	g.	Identify and use combs.	3.8
	h.	Select appropriate equipment.	3.7
	k.	Interpret equipment operation instructions.	3.6

Not included on questionnaire but recommended by some experts surveyed.

	l.	Store instruments and equipment.	3.5
	m.	Use mat splitter.	3.4
	n.	Identify and use thinning shears.	3.4
	o.	Use vacuum cleaner.	3.4
	p.	Identify and use nail files.	3.2
	q.	Identify and use rake.	3.1
	r.	Identify and use carder.	2.6
	s.	Identify and use dental equipment.	1.7
8.	Perform emergency first aid.		3.5
	a.	Apply antiseptic.	3.6
	b.	Apply minor medication.	3.6
	c.	Cleanse wounds.	3.6
	d.	Stop external bleeding.	3.5
	e.	Maintain body temperature.	3.2
9.	Inventory products.		3.2
	a.	Remove contaminated items.	3.4
	b.	Take physical inventory.	3.1
	c.	Order supplies.	3.1
10.	Sell and market products.		3.5
	a.	Meet customers.	3.6
	b.	Make change.	3.5
	c.	Handle customer inquiries and complaints.	3.4
11.	Follow legal regulations.		3.9
	a.	Determine what duties may be performed.	3.9
12.	Maintain facilities.		3.7
	a.	Clean holding pens, cages, and runs.	3.9
	b.	Clean waiting and grooming rooms.	3.8
	c.	Dispose of residue and trash.	3.8
	d.	Control ventilation.	3.8
	e.	Clean sinks and bathing areas.	3.8
	f.	Clean and disinfect pens.	3.7
	g.	Lay out grooming equipment.	3.5
13.	Follow safety precautions.		3.7
	a.	Follow safe work habits.	3.8
	b.	Identify potential safety hazards.	3.8
	c.	Administer minor first aid for cuts, bruises, burns, etc.	3.7
	d.	Use fire extinguishers.	3.7
	e.	Store chemicals safely.	3.7
	f.	Wear appropriate protective clothing.	3.5
14.	Interpret grooming terminology.		3.6
	a.	Identify long-haired breeds requiring little trimming.	3.8
	b.	Identify the various kinds of clips.	3.8

c.	Identify the various terriers.	3.7
d.	Identify the various poodles.	3.7
e.	Identify the Cocker Spaniel.	3.7
f.	Identify the Pekingese.	3.6
g.	Identify Afghan Hound.	3.5
h.	Identify the Setters.	3.5
i.	Identify the Golden Retriever.	3.5

AGRICULTURAL MECHANICS

The mechanization of food and fiber production and processing in the United States during the last one hundred years has been one of the major reasons our nation is one of the best fed countries in the world today. Animal and human muscles have been, to a large extent, replaced in food and fiber production and processing by machines, gasoline powered tractors and trucks, and electric motors.

To operate and maintain these machines, tractors, trucks, and motors requires many skilled persons in essential agricultural mechanics occupations. The occupations surveyed in this national study are reported on the following pages.

Occupation Cluster/Occupations		Page
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	Small Engine Mechanic	310
	Farm Tractor & Equipment Operator . .	314
	Farm Equipment Salesman	319
	Irrigation Technician	322

PRODUCTION AGRICULTURE MECHANIC

Job Description:

Beginning employees or beginning owners or operators in farming and ranching must make repairs to buildings, facilities, and equipment; and at times construct new equipment, facilities, or buildings according to the needs of their farm or ranch.

Competencies Identified and Validated

N = 107*

Competencies	Weighted Mean**
1. Identify and fit shop tools and equipment.	2.3
a. Identify tools and equipment.	3.0
b. Fit handles in hammers, axes, hatchets, and picks.	2.6
c. Sharpen twist drills.	2.5
d. Fit handles in hoes, rakes, and forks.	2.5
e. Sharpen shovels and hoes.	2.3
f. Sharpen cold chisels and plane blades.	2.3
g. Sharpen screwdrivers.	2.2
h. True grinding wheels.	2.1
i. Sharpen axes, hatchets and picks.	2.1
j. Sharpen auger bits.	2.0
k. Sharpen wood chisels and plane blades.	2.0
2. Maintain and service a home farm shop.	2.5
a. Maintain a clean and orderly shop area.	3.2
b. Place and use fire fighting equipment.	3.1
c. Maintain and service air compressor.	2.6
d. Order and inventory supplies and parts.	2.6
e. Install power driven equipment.	2.5
f. Understand and apply OSHA and/or COSH regulations.	2.4
g. Plan shop layout.	2.4
h. Select shop building.	2.3
i. Inventory tools and equipment.	2.3
j. Select shop site.	2.1
3. Use drawings and blueprints.	2.4
a. Read and interpret drawing.	3.1

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* Responses from 107 Farmers and Ranchers in 20 states. Survey conducted by Agricultural Education Section, Department of Vocational Education, Colorado State University, Fort Collins, Colorado 80523.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Apply dimensions to drawings.	2.8
	c.	Figure bills of materials.	2.7
	d.	Read blueprints.	2.0
	e.	Make free hand sketches.	1.9
	f.	Make drawings to scale.	1.9
4.		Learn farm carpentry skills.	2.5
	a.	Drive and remove nails.	3.0
	b.	Operate power saws.	3.0
	c.	Saw to dimension with hand and/or power saws.	3.0
	d.	Bore holes.	2.8
	e.	Set screws.	2.8
	f.	Select appropriate fasteners (nails, hinges, etc.).	2.7
	g.	Select kinds and grades of lumber for a job.	2.7
	h.	Lay out and construct small buildings.	2.6
	i.	Plane to dimension with hand and/or power tools.	2.5
	j.	Use wood chisels.	2.4
	k.	Lay out and cut common rafters.	2.4
	l.	Glue wood.	2.3
	m.	Operate jointer.	1.6
	n.	Operate thickness planer.	1.5
5.		Properly use paint and paint equipment.	2.6
	a.	Clean and store spray gun.	2.9
	b.	Clean and store paint brushes and rollers.	2.9
	c.	Prepare metal surfaces.	2.6
	d.	Prepare wood surfaces.	2.6
	e.	Apply paint with brush or roller.	2.6
	f.	Select paints or preservatives.	2.6
	g.	Apply paint with spray gun.	2.5
	h.	Mask areas prior to painting.	2.5
	i.	Compute area for applying paint or preservatives.	2.4
6.		Operate an arc welder.	2.9
	a.	Practice safety in arc welding.	3.5
	b.	Operate AC welder.	3.4
	c.	Select electrodes.	3.4
	d.	Determine amperage and polarity settings.	3.4
	e.	Strike arc.	3.4
	f.	Prepare metal for welding.	3.3
	g.	Run flat beads.	3.2
	h.	Make butt welds.	3.2
	i.	Make lap welds.	3.2
	j.	Make fillet welds.	3.1
	k.	Run vertical beads.	3.1
	l.	Construct equipment using arc welder.	3.1
	m.	Run overhead beads.	3.0

	n.	Control distortion.	2.9
	o.	Hard surfaces with arc.	2.8
	p.	Operate DC welder.	2.8
	q.	Build up iron parts.	2.7
	r.	Weld cast iron.	2.6
	s.	Punch holes.	2.5
	t.	Cut with arc.	2.5
	u.	Heat with carbon arc torch.	2.3
	v.	Braze with carbon arc torch.	2.2
	w.	Weld aluminum.	2.2
	x.	Operate metal inert gas (MIG) welder.	2.0
	y.	Operate tungsten inert gas (TIG) welder.	1.7
7.	Operate an oxy-acetelyne welder.		3.0
	a.	Check for leaks.	3.4
	b.	Shut off equipment.	3.4
	c.	Turn on equipment.	3.4
	d.	Adjust pressure regulator.	3.3
	e.	Change cylinder.	3.3
	f.	Light and adjust flame.	3.3
	g.	Cut with cutting torch.	3.3
	h.	Clean tips.	3.3
	i.	Choose proper tip size.	3.2
	j.	Run bead with rod.	3.0
	k.	Braze thin metal.	3.0
	l.	Apply hard surfacing material.	3.0
	m.	Run flat beads.	2.9
	n.	Braze cast iron.	2.9
	o.	Make butt weld.	2.8
	p.	Make fillet welds.	2.8
	q.	Build up iron parts with bronze.	2.8
	r.	Make lap welds.	2.8
	s.	Run vertical beads.	2.7
	t.	Run bead without rod.	2.7
	u.	Run overhead beads.	2.6
8.	Perform skills for hot and cold metal work.		2.4
	a.	Cut thread with tap and die.	3.0
	b.	Drill holes.	3.0
	c.	Use files.	2.9
	d.	Identify metals.	2.8
	e.	Cut with tin snips.	2.8
	f.	Solder metal.	2.7
	g.	Cut with cold chisel.	2.7
	h.	Cut with hand hack saw.	2.6
	i.	Bend metal.	2.6
	j.	Use and maintain soldering copper.	2.5
	k.	Use power hack saw.	2.4
	l.	Form sheet metal joints.	2.3
	m.	Anneal, harden, and temper metal.	2.3
	n.	Draw-out metal.	2.1

o.	Up-set metal.	1.9
p.	Operate metal-working lathe.	1.8
q.	Operate gas forge.	1.5
r.	Operate coal forge.	1.3
9.	Learn skills for concrete and masonry work.	2.5
a.	Pour concrete.	2.8
b.	Trowel concrete.	2.8
c.	Protect concrete while curing.	2.8
d.	Reinforce concrete.	2.8
e.	Mix concrete.	2.8
f.	Build and prepare forms.	2.7
g.	Remove forms.	2.7
h.	Embed bolts.	2.7
i.	Edge concrete.	2.6
j.	Drill holes in concrete.	2.5
k.	Treat forms.	2.4
l.	Lay concrete blocks.	2.3
m.	Test aggregates for impurities.	2.1
n.	Lay brick.	1.9
10.	Operate and maintain farm engines.	3.3
a.	Change oil and oil filters.	3.6
b.	Service air and fuel filters.	3.6
c.	Maintain battery water.	3.6
d.	Start and operate both gas and diesel engines properly.	3.6
e.	Read and follow operator's manuals.	3.5
f.	Remove and connect battery cables.	3.5
g.	Charge batteries.	3.4
h.	Troubleshoot and identify fuel problems.	3.3
i.	Troubleshoot and identify ignition problems.	3.3
j.	Maintain and operate small gas engines (2 and 4 cycle).	3.1
k.	Identify engine components and systems.	3.1
l.	Determine voltage of batteries.	3.0
m.	Read battery hydrometer.	3.0
11.	Learn minor tuneup and repairs for farm engines.	2.5
a.	Clean, gap, and replace spark plugs.	3.5
b.	Clean, install, and gap breaker points.	3.3
c.	Install condensors.	3.3
d.	Adjust carburetor mixture and speed screws.	3.0
e.	Time engines using timing light.	2.9
f.	Set float levels in carburetors.	2.8
g.	Disassemble and reassemble distributors.	2.7
h.	Set breaker point dwell using a dwell meter.	2.7
i.	Measure compression.	2.6
j.	Adjust valves.	2.6

	k.	Measure vacuum.	2.6
	l.	Replace solenoids and bendix gears.	2.5
	m.	Clean brush holders and install brushes.	2.4
	n.	Disassemble and clean starting motors.	2.4
	o.	Test and replace coils.	2.3
	p.	Test fuel pumps.	2.3
	q.	Rebuild carburetors.	2.3
	r.	Clean commutator bars.	2.1
	s.	Operate distributor testing machine.	2.1
	t.	Test injector on diesel engines.	2.1
	u.	Repair alternators.	2.0
	v.	Test generator with growler.	1.9
	w.	Operate exhaust analyzer.	1.6
12.	Overhaul and repair farm engines.		2.2
	a.	Torque cylinder head bolts.	2.5
	b.	Replace pan and gasket assemblies.	2.4
	c.	Overhaul engines.	2.4
	d.	Remove and inspect cylinder heads.	2.4
	e.	Install and torque main bearings and rod caps.	2.3
	f.	Assemble and install cylinder heads.	2.3
	g.	Remove piston assembly.	2.3
	h.	Hone cylinders.	2.3
	i.	Replace piston rings.	2.2
	j.	Install oil pump.	2.2
	k.	Ream cylinder ridge.	2.2
	l.	Install timing gear and/or chains.	2.2
	m.	Install piston assembly.	2.2
	n.	Determine valve stem guide clearance.	2.2
	o.	Replace rocker arms.	2.2
	p.	Check piston ring end gap.	2.2
	q.	Install crankshaft.	2.2
	r.	Measure ring band clearance.	2.2
	s.	Replace valve guides.	2.2
	t.	Grind valves; reface valves and valve seats.	2.2
	u.	Measure cylinder taper and roundness.	2.1
	v.	Replace hydraulic valve lifters.	2.1
	w.	Use plastigage, micrometers, and other measuring devices to determine wear and/or clearance.	2.1
	x.	Test valve springs.	2.1
13.	Operate and maintain trucks and tractors.		3.2
	a.	Keep fuel and lubricants clean.	3.6
	b.	Operate tractors (wheeled).	3.6
	c.	Maintain oil level in tractor hydraulic systems.	3.6
	d.	Lubricate trucks and tractors.	3.6
	e.	Test anti-freeze.	3.4
	f.	Service cooling systems.	3.3
	g.	Repack and adjust front wheel bearings.	3.2

h.	Adjust brakes.	3.2
i.	Service tires.	3.2
j.	Adjust clutches.	3.1
k.	Load and unload trucks by hand or with mechanical devices (hoists, lifts, winches, etc.).	3.1
l.	Install wheel weights.	2.9
m.	Remove and mount tractor tires.	2.9
n.	Adjust steering mechanisms.	2.9
o.	Operate tractors (tracked).	2.4
14.	Make minor repairs on trucks and tractors.	2.6
a.	Check and replace water hoses.	3.2
b.	Pack wheel bearings.	3.2
c.	Test and replace fan belts.	3.2
d.	Replace thermostats.	3.1
e.	Clean radiators and cooling systems.	3.0
f.	Replace water pumps.	3.0
g.	Replace oil seals.	3.0
h.	Bleed brake lines.	3.0
i.	Install brake linings.	2.8
j.	Replace voltage regulators.	2.8
k.	Test radiator pressure caps.	2.7
l.	Adjust voltage regulators.	2.5
m.	Service power steering units.	2.5
n.	Service engine governor and linkage.	2.5
o.	Operate steam cleaner or high pressure cleaner.	2.4
15.	Learn the hydraulic systems of trucks and tractors.	2.6
a.	Stop leaks in hydraulic systems.	3.1
b.	Clean hydraulic system breather cap or air vent.	3.0
c.	Drain, clean, flush, and refill hydraulic system.	3.0
d.	Clean and replace hydraulic lines.	3.0
e.	Replace hydraulic "O" rings.	2.9
f.	Replace hydraulic fittings.	2.9
g.	Troubleshoot hydraulic systems.	2.9
h.	Install hydraulic hose connections.	2.9
i.	Bleed hydraulic systems.	2.8
j.	Maintain hydraulic cylinders.	2.8
k.	Clean hydraulic system orifices.	2.7
l.	Clean hydraulic relief valves.	2.5
m.	Analyze malfunctions of hydraulic pumps.	2.5
n.	Service and repair external hydraulic pumps.	2.5
o.	Repair hydraulic cylinders.	2.5
p.	Service hydraulic motors.	2.4
q.	Determine hydraulic cylinder lift force.	2.2
r.	Repair hydraulic motors.	2.2
s.	Operate a hydraulic tester.	2.2

t.	Service and repair internal hydraulic pumps.	2.2
u.	Determine hydraulic cylinder displacement.	2.1
16.	Operate and maintain farm machinery.	3.2
a.	Read and follow operators' manuals.	3.6
b.	Know and comply with safety rules relating to the operation of each piece of farm machinery.	3.6
c.	Make operating adjustments.	3.5
d.	Hitch implements.	3.4
e.	Adjust V-belts for tension.	3.4
f.	Repair equipment under field conditions.	3.4
g.	Clean planting equipment.	3.4
h.	Lubricate field machines.	3.3
i.	Clean fertilizer equipment.	3.3
j.	Replace bearings and races.	3.3
k.	Read and follow technical service manuals.	3.3
l.	Repair roller and hook-link chains.	3.2
m.	Operate field machines.	3.1
n.	Recondition worn equipment.	3.1
o.	Calibrate field machines.	3.1
p.	Troubleshoot machines.	2.8
q.	Store equipment.	2.7
r.	Assemble new machinery.	2.7
s.	Construct machinery and equipment.	2.7
t.	Determine field efficiency of machines.	2.6
17.	Repair power systems.	3.0
a.	Attach and maintain P.T.O. shaft.	3.3
b.	Adjust belt tension.	3.2
c.	Service shafts and universal joints.	3.2
d.	Adjust sprocket chains and wheels.	3.1
e.	Adjust belts and pulleys for proper speed.	3.1
f.	Size and replace belts/V belts.	3.1
g.	Service flexible shafts.	3.0
h.	Measure shaft R.P.M. with a tachometer.	2.6
i.	Splice flat belts.	2.1
18.	Learn rural electrification skills.	2.9
a.	Use safety measures in electrical wiring.	3.5
b.	Select correct fuse sizes.	3.2
c.	Replace fuses.	3.2
d.	Make splices.	3.0
e.	Repair electrical cords.	3.0
f.	Wire on-off switches.	2.9
g.	Select wire sizes.	2.9
h.	Know electrical terminology such as: volts, amps, watts, ohms.	2.9
i.	Attach wires to terminals.	2.9
j.	Solder splices.	2.8

	k.	Install wire nut connectors.	2.8
	l.	Install light fixtures.	2.8
	m.	Install electric motors.	2.8
	n.	Wire buildings and structures.	2.6
	o.	Wire three-way switches.	2.6
	p.	Wire four-way switches.	2.3
19.	Operate and maintain electric motors.		2.5
	a.	Start and stop large electric motors properly to prevent damage to pumps, grinders, mixers, etc.	2.9
	b.	Maintain electric motors.	2.8
	c.	Identify and select electric motors.	2.7
	d.	Figure electric motor pulley size and speeds.	2.5
	e.	Change direction of rotation of electric motors.	2.4
	f.	Check amperage draw under load.	2.4
	g.	Change electric motors from 120 volts to 240 volts or vice versa.	2.2
	h.	Repair electric motors.	2.1
20.	Learn home convenience and sanitation skills.		2.6
	a.	Repair leaky faucets.	2.9
	b.	Assemble pipe and pipe fittings.	2.9
	c.	Thread pipe.	2.9
	d.	Measure and cut pipe.	2.9
	e.	Cut plastic tubing/pipe.	2.9
	f.	Install plastic tubing/pipe.	2.9
	g.	Flare copper tubing.	2.8
	h.	Cut copper tubing.	2.8
	i.	Ream pipe.	2.8
	j.	Install fixtures on plastic pipe.	2.8
	k.	Sweat joints on copper pipe.	2.6
	l.	Adjust air control mechanism on pressure system.	2.5
	m.	Install pressure pumps.	2.5
	n.	Cut soil pipe.	2.4
	o.	Install water heaters.	2.4
	p.	Repair pumps.	2.4
	q.	Caulk joints on soil pipe.	2.3
	r.	Lay soil pipe.	2.2
	s.	Cut and install glass.	2.2
	t.	Measure, cut, and install fiberglass or plexiglass.	2.2
	u.	Service septic tanks.	2.1
21.	Use surveying equipment and do surveying.		2.3
	a.	Measure fields with wheels, tapes, chains, or A-frames.	2.6
	b.	Set up the farm level.	2.5

	c.	Read surveying rod.	2.4
	d.	Lay out lines to grade.	2.4
	e.	Determine elevations with farm level.	2.4
	f.	Lay out building foundations with farm level.	2.4
	g.	Measure slope with farm level.	2.3
	h.	Read contour maps.	2.3
	i.	Lay out contour lines.	2.2
	j.	Make contour maps.	1.8
22.	Perform skills used in irrigation and drainage.		2.2
	a.	Start irrigation pump.	2.5
	b.	Set up and move irrigation pipe.	2.4
	c.	Pack and adjust packing glands on pump.	2.4
	d.	Measure water through gates or weirs.	2.3
	e.	Calculate amount of water applied.	2.3
	f.	Repair sprinkler heads.	2.3
	g.	Lay out irrigation systems.	2.2
	h.	Install drainage tile.	1.9
	i.	Construct terraces.	1.8
	j.	Construct reservoirs.	1.7
23.	Build and repair farm fences.		3.1
	a.	Brace corner posts.	3.3
	b.	Repair fences.	3.3
	c.	Stretch wire.	3.3
	d.	Secure wire to posts.	3.2
	e.	Splice wire.	3.2
	f.	Set posts.	3.2
	g.	Build wire gates.	3.2
	h.	Set steel posts.	3.2
	i.	Dig post holes.	3.1
	j.	Lay out fence lines.	3.1
	k.	Anchor fence lines.	3.1
	l.	Trouble shoot electric fences.	3.0
	m.	Install electric fences.	3.0
	n.	Install manufactured gates.	3.0
	o.	Install fences across water gaps and ditches.	3.0
	p.	Use power posthole digger.	2.9
	q.	Treat fence posts.	2.3
24.	Repair and construct farm buildings.		2.8
	a.	Repair farm buildings.	3.1
	b.	Evaluate existing buildings for repairs or remodeling.	2.9
	c.	Estimate costs of new buildings.	2.7
	d.	Construct or assist in constructing large buildings.	2.7

e.	Plan new buildings.	2.7
25.	Repair and construct livestock equipment.	2.5
a.	Construct livestock handling equipment.	2.8
b.	Use and maintain livestock spraying equipment.	2.8
c.	Maintain and sharpen clippers and shears.	2.4
d.	Clean, oil, and preserve leather.	2.3
e.	Make rope halters.	2.2

SETUP MECHANIC OF FARM AND INDUSTRIAL EQUIPMENT

Other Titles: Farm Mechanic, Field Equipment - Farm Maintenance Mechanic.

Job Description:

Services, adjusts, and makes minor repairs on farm vehicles, machinery, and equipment, such as tractors, trucks, automobiles, harvesters, combines, silo fillers, plows, and similar equipment. Using hand tools: observes and examines machinery and parts in operation to detect malfunctioning or defective units. Replace component, such as carburetors, fuel pumps, generators, ignition points, and spark plugs. Adjusts timing of motors, lubricates, washes, paints, and cleans vehicles and attachments. May assist other workers in more complex maintenance tasks, such as overhaul of machinery and equipment, repair and erection of buildings and structures, plumbing repair, and electrical work on the farm.

Competencies Identified and Validated

N = 29*

Competencies	Weighted Mean**
1. Maintain and service power machinery systems.	
a. Change oil and filter.	3.6
b. Check coolant freezing point.	3.6
c. Lubricate all types of equipment.	3.5
d. Service air cleaners, dust unloading valves and precleaners.	3.3
e. Service or replace batteries and cables.	3.2
f. Recommend oils and lubricants for all types of machinery.	3.1
g. Prepare cooling system for cold weather.	3.1
h. Demonstrate safety rules for handling tractor fuel.	3.0
i. Identify sources of contamination of oil.	2.7
j. Describe operation of hydrostatic transmission.	2.2
2. Repair hydraulics.	
a. Remove, clean, and replace hydraulic filters.	3.3
b. Recommend schedule for replacing filters.	2.9
c. Remove and replace telescoping hydraulic cylinders.	2.8

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* Responses from 29 Farm Equipment Dealerships in 4 states. Survey conducted by Department of Agricultural Education, University of Missouri, Columbia, Missouri 65201.

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3. Maintain and adjust planting equipment systems.

a.	Calibrate planter for row width and population.	3.2
b.	Remove and replace furrow openers.	2.8
c.	Set up grain drill delivered from factory.	2.7
d.	Prepare grain drill for storage.	2.7
e.	Adjust planter to different planting depths.	2.6
f.	Install fertilizer hose.	2.5
g.	Set up planter delivered from factory.	2.4
h.	Select and install correct seed plates.	2.4
i.	Calibrate hydraulic transport and leveling system.	2.4
j.	Clean and service planters for storage.	2.4
k.	Recommend seed drum for specific conditions.	2.3
l.	Service and adjust fluted and double run feed drills.	2.3
m.	Recommend speed at which planter is to be driven.	2.2
n.	Install and service no-till coulters.	2.2
o.	Repair and adjust fertilizer drill.	2.2
p.	Prepare drill and seeder for storage.	2.2
q.	Calibrate planter fertilizer rate.	2.1
r.	Install and calibrate herbicide and insecticide attachments.	2.1
s.	Install grass seed attachment.	2.1
t.	Repair and adjust grass seeder.	2.0
u.	Test accuracy of acremeter.	1.9

4. Maintain and adjust tillage equipment systems.

a.	Set up plow delivered from factory.	3.2
b.	Assemble cultivator.	3.1
c.	Align sweeps for proper tillage.	3.1
d.	Adjust for proper trailing and furrow filling.	3.1
e.	Service and adjust tamden disc.	3.0
f.	Adjust attachments for best tillage situation.	2.9
g.	Set up folding gangs.	2.8
h.	Set up carrier for cultivators.	2.7
i.	Recommend tool arrangement.	2.6
j.	Set up spring or spike tooth harrow.	2.6
k.	Set up rotary hoe.	2.6
l.	Prepare plow for storage.	2.5

5. Maintain and adjust combine systems.

a.	Adjust cylinder and concave.	3.0
b.	Troubleshoot thrashing system.	2.9
c.	Adjust straw walkers.	2.9
d.	Inspect and repair sickle bar, knives, guards, and wear plates.	2.9
e.	Clean and service grain and tailing elevators.	2.8

f.	Adjust and service boot grain supply augers.	2.8
g.	Adjust and service cleaning unit.	2.8
h.	Inspect and service separating unit.	2.8
i.	Attach platform and grain feeder to separator.	2.8
j.	Adjust auger height.	2.7
k.	Remove and replace unloading auger.	2.7
l.	Adjust rear axle to desired width.	2.6
m.	Adjust reel speed to specific crop condition.	2.4
n.	Condition combine for storage.	2.4
o.	Troubleshoot cutting problems.	2.3
6.	Maintain and adjust forage harvesting systems.	
a.	Time the baler and test by hand.	2.9
b.	Service and adjust knotter.	2.8
c.	Assemble baler shipped from factory.	2.7
d.	Adjust shear bar to specification.	2.7
e.	Align and adjust cutting bar.	2.6
f.	Remove and replace sickle knives, guards, and wear plates.	2.5
g.	Adjust or replace lifting mechanism.	2.5
h.	Service or replace shearing safety mechanism.	2.5
i.	Remove and replace cylinder knives.	2.5
j.	Replace rake teeth.	2.4
k.	Install and adjust swath deflectors.	2.4
l.	Clean and lubricate baler for storage.	2.4
m.	Inspect and service auger.	2.4
n.	Install and service bale injector.	2.4
o.	Adjust tying mechanism or wire tie.	2.4
p.	Service and repair twine wrapping mechanism.	2.4
q.	Set up table for efficient cleaning.	2.4
r.	Service hydraulic bale compression system.	2.3
s.	Adjust for correct bale density and diameter.	2.3
t.	Recommend correct tensions for baler.	2.3
u.	Repair or replace forage deflects.	2.3
v.	Recommend adjustment for adequate cleaning of ground.	2.2
w.	Adjust or replace inner or outer mower shoe.	2.2
x.	Install wagon hitch or baler.	2.1
y.	Install or repair bale counter.	2.1
z.	Service and adjust pickup conveyor.	2.1
aa.	Align by strippers with rake teeth.	2.0
bb.	Adjust reel speed.	2.0
7.	Perform general shop tasks.	
a.	Read and assemble machinery from drawings.	3.6
b.	Identify parts from drawings.	3.6
c.	Set up machines using shop manual.	3.4
d.	Preservice machinery.	3.3
e.	Fill out a job ticket.	3.2
f.	Operate a steam cleaner and a high pressure washer.	3.2

g.	Check shipping invoice from drawings.	3.1
h.	Attach and read an electric tachometer.	3.1
i.	Pickup and deliver machinery.	3.0
j.	Cut and heat with oxyacetylene welder.	2.7
k.	Sketch a layout from designed plans.	2.6
l.	Select welding electrode for specific jobs.	2.6
m.	Butt and fillet weld in all positions with arc welder.	2.4

8. Maintain shop safety.

a.	Wear eye and hearing protection.	3.9
b.	Use power hand tools safely.	3.8
c.	Store combustible materials safely.	3.8
d.	Install and adjust safety guards on machinery.	3.7
e.	Use high pressure fluids safely.	3.7
f.	Store chemicals correctly.	3.6
g.	Ventilate engine while running.	3.5
h.	Select proper fire extinguisher for type of fire.	3.5
i.	Administer first aid prior to medical treatment.	3.4
j.	Use standard hand signals in high noise areas.	3.4
k.	Read and interpret safety signs, symbols, and color codes.	3.4
l.	Provide adequate lighting.	3.3
m.	Use compressed air safely.	3.0

TRACTOR MECHANICS HELPER

Job Description:

Tractor Mechanics helper assists tractor mechanic in repairing tractors and tractor components, using hand tools: installs jacks and hoists to raise equipment and lift dismantled assemblies. Disassembles and assembles tractor parts, using machines, hand tools. Clean tools and parts with naphtha, gasoline, or other cleaning compounds. May wash and lubricate equipment. Performs other duties as described under helper.

Competencies Identified and Validated

N = 32*

Competencies	Weighted Mean**
1. Maintain and repair engine system.	
a. Remove and replace rings.	4.0
b. Time internal components.	3.4
c. Remove and replace cylinder head.	3.1
d. Inspect and clean cylinder block.	3.1
e. Remove and replace crankshaft bearing.	3.1
f. Remove and replace main bearings.	2.9
g. Inspect milled surfaces of cylinder block and head.	2.8
h. Remove and replace sleeve.	2.8
2. Maintain and repair electrical system.	
a. Clean, gap, and test spark plugs.	2.9
b. Set ignition timing.	2.8
c. Service or replace battery cables.	2.8
d. Inspect secondary circuit leaks, plug wires, distributor caps, and rotor.	2.6
e. Diagnose spark plug conditions and recommend head ranges.	2.3
f. Replace windshield wiper mechanisms or controls.	2.3
g. Strobe distributor and modify or correct advance curve.	1.8
3. Maintain and repair fuel delivery system.	
a. Adjust carburetor for load.	3.4
b. Install carburetors.	2.8

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* Responses from 32 Farm Equipment Dealerships in 5 states. Survey conducted by the Department of Agricultural Education, University of Missouri, Columbia, Missouri 65201.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Bleed air from diesel fuel system.	2.8
d.	Adjust carburetor for idle.	2.7
e.	Test pressure of transfer pump.	2.7
f.	Test injector for opening pressure.	2.6
g.	Adjust carburetor for best fuel economy.	2.5
h.	Clean carburetor.	2.5
i.	Repair or replace gasoline carburetor.	2.5
j.	Test injector for valve seat leakage.	2.4
k.	Test injector for spray pattern.	2.4
l.	Test injector for nozzle leak back.	2.4
m.	Repair and replace fuel injector.	2.4
n.	Adjust floating setting to specification.	2.3
o.	Install and time the injection pump.	2.3
p.	Adjust governor.	2.3
q.	Repair and replace injector nozzle.	2.2
r.	Troubleshoot gasoline carburetor problem.	2.1
s.	Diagnose injector problems.	2.1
t.	Clean, inspect, and diagnose wear of injector nozzle.	2.1
4.	Maintain and repair intake and exhaust systems.	
a.	Remove and replace valves.	2.8
b.	Remove and replace rocker arm.	2.6
c.	Inspect and replace valve spring.	2.4
d.	Inspect and replace can followers.	2.4
e.	Inspect and replace valve rotators.	2.3
f.	Recondition valve face and seat.	2.3
g.	Diagnose turbochargers - superchargers problems.	1.7
h.	Inspect and replace turbocharger impeller.	1.5
i.	Measure bearing clearance of turbocharger.	1.4
5.	Maintain and repair lubrication system.	
a.	Test engine oil pressure.	2.9
b.	Service crankcase ventilation system.	2.6
c.	Repair and replace crankcase ventilation system.	2.6
d.	Test oil relief pressure valve.	2.4
e.	Inspect and replace bushings and bearings.	2.4
f.	Clean and adjust pressure regulating valve.	2.3
g.	Identifying and diagnosing oil pressure problems.	2.3
h.	Diagnose lubrication system failure.	2.1
i.	Identify sources of contamination of oil.	2.1
6.	Maintain and repair cooling system.	
a.	Identify internal coolant leakage.	2.3
7.	Maintain and repair mechanical transmission system.	
a.	Separate engine from clutch housing.	3.2
b.	Align transmission with engine.	2.8
c.	Adjust clutch linkage.	2.8
d.	Replace oil seals and oil slinger rings.	2.6

	e.	Remove and replace spring-loaded clutch.	2.6
	f.	Remove and replace bearings.	2.5
	g.	Remove and replace bushings.	2.5
	h.	Remove and replace worn or scuffed gears.	2.5
	i.	Clean splines and test for wear.	2.4
8.	Repair hydraulics.		
	a.	Remove and replace seals in the hydraulic system.	2.6
	b.	Test opening pressure of valves.	2.5
	c.	Troubleshoot malfunction of cylinder.	2.4
	d.	Remove and replace pressure control valves.	2.3
9.	Maintain and repair brake system.		
	a.	Remove and replace disk brakes assembly.	2.5
10.	Maintain and repair final drive system.		
	a.	Adjust pinion mesh according to specifications.	3.0
	b.	Remove and replace seals in final drive.	2.6
	c.	Remove and replace axle.	2.6
	d.	Replace pinion and ring gear in final drive.	2.3
	e.	Troubleshoot cause of excessive wear on final drive.	2.1
	f.	Adjust backlash in final drive.	2.0
11.	Perform general shop tasks.		
	a.	Safely store combustible materials.	3.4
	b.	Heat with oxyacetylene.	3.2
	c.	Set up and operate dynamometer.	3.0
	d.	Take measurement and read micrometer.	2.9
	e.	Fusion weld with oxyacetylene.	2.8
	f.	Recondition and sharpen hand tools.	2.8
	g.	Take measurement and read dial indicator.	2.8
	h.	Attach and read dwell meter.	2.7
	i.	Take measurement and read plastigauge.	2.7
	j.	Remove broken stud bolts.	2.7
	k.	Butt weld with electric arc.	2.3
	l.	Fillet weld with electric arc.	2.3
	m.	Select welding electrodes for specific jobs.	2.2
	n.	Vertical weld with electric arc.	2.2
	o.	Weld cast iron with oxyacetylene.	2.2
	p.	Cut with oxyacetylene.	2.2
	q.	Horizontal weld with electric arc.	2.0
	r.	Over head weld with electric arc.	2.0
	s.	Ink gears and determine tolerance.	2.0
	t.	Braze with oxyacetylene.	1.9
	u.	Cut with electric arc.	1.8
	v.	Use safety procedures with welding.	1.8

12. Maintain shop safety.

a.	Read and interpret color codes.	3.8
b.	Store chemical correctly.	3.8
c.	Use power hand tools safely.	3.6
d.	Use compressed air safely.	3.6
e.	Use personal protective equipment.	3.5
f.	Provide adequate lighting.	3.5
g.	Wear eye protection.	3.5
h.	Store combustable material safely.	3.4
i.	Select proper fire extinguishers for type of fire.	3.4
j.	Read and interpret safety signs and symbols.	3.3
k.	Ventilate engines while running.	3.3
l.	Install and adjust guards on equipment.	3.3
m.	Install and adjust guards on machinery.	3.3
n.	Administer first aid prior to medical treatment.	2.9
o.	Use standard hand signals in high noise areas.	2.9
p.	Wear hearing protection.	2.8
q.	Test electrical circuits and switches.	2.5

PARTSMAN IN FARM MACHINERY DEALERSHIP

Other Titles: Partsman, Farm Machinery Partsman.

Job Description:

A Partsman in a farm machinery dealership is responsible for the selling of spare and replacement parts to customers and dispensing replacement parts for service jobs. A Partsman is responsible for receiving, storing, and maintaining an inventory of machinery parts. The partsman must be able to identify parts, determine parts numbers, and determine prices. Continual contact with customers through sales requires that a Partsman be able to work harmoniously with customers to maximize customer satisfaction.

Competencies Identified and Validated

N = 30*

Competencies		Weighted Mean**
1.	Learn parts sales techniques.	3.3
a.	Determine price of part from price lists.	3.8
b.	Sell parts to customers.	3.8
c.	Make out sales receipts.	3.8
d.	Use parts catalog or microfilm to determine part name and stock numbers.	3.8
e.	Read and interpret diagrams in parts manuals.	3.7
f.	Receive telephone orders for parts.	3.6
g.	Determine the make, model, year, and type of equipment for which a part is needed.	3.6
h.	Record parts identification and price on service tickets.	3.6
i.	Make out credit slips and re-stock returned parts.	3.5
j.	Locate and retrieve parts from storage area.	3.5
k.	Advise customers when out-of-stock parts will be available.	3.5
l.	Determine that any new parts returned for credit are complete and undamaged.	3.4
m.	Advise customers of parts needed.	3.4
n.	Advise customers of related parts, accessories, and consumable items that may be needed.	3.4
o.	Sell related parts, accessories, and consumable items to customers.	3.4

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* Responses from 30 Farm Machinery Dealers in 9 states. Survey conducted by Agricultural and Occupational Education Division of the Education Department, Cornell University, Ithaca, New York 14853.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

p.	Interpret serial numbers to identify model of equipment for which a part is needed.	3.3
q.	Refer customers to salesperson for major equipment purchases.	3.3
r.	Identify parts needed by service department from verbal description.	3.3
s.	Dispense parts to service department.	3.3
t.	Guide customers to location of serial and parts numbers on equipment.	3.2
u.	Explain parts warranty and guarantee provisions to customers.	3.2
v.	Encourage multiple purchases of consumable items.	3.1
w.	Explain dealer policy to customers.	3.1
x.	Use adding machine to total prices.	3.1
y.	Provide customer refunds or exchanges under manufacturer's warrantees or dealership guarantees.	3.0
z.	Check credit references of customers.	2.8
aa.	Operate cash register to record sales.	2.8
bb.	Refer customers to other dealers for parts not in current inventory or discontinued.	2.7
cc.	Refer customers to shop for evaluation of warranty coverage on parts returned.	2.6
dd.	Advise customers on procedure for installation of parts.	2.4
2.	Learn warehousing and merchandising systems.	2.8
a.	Store parts in stockroom according to dealership inventory system.	3.7
b.	Arrange stockroom for efficient use.	3.4
c.	Display new and fast moving items.	3.2
d.	Stock self-service shelves with consumable items.	3.0
e.	Prepare and maintain displays of tools and accessories.	2.6
f.	Put price tags on displayed items.	2.5
g.	Assemble small equipment such as chainsaws, mulchers, etc.	1.4
3.	Use processing and shipping skills.	3.3
a.	Unpack and check items received against invoices.	3.8
b.	Resolve any shortages, damaged, or wrong items in shipments received.	3.8
c.	Make out invoices for items to be shipped.	3.5
d.	Mail or ship parts to fill customer orders.	3.4
e.	Ship warranty claim parts to manufacturer for credit.	3.3
f.	Package parts for shipping.	3.3

	g.	Ship defective parts to manufacturer for credit.	3.3
	h.	Ship parts via least cost carrier.	3.1
	i.	Ship exchange parts to manufacturer for rebuilding.	3.0
	j.	Arrange for insurance on shipments according to dealership policies.	2.9
	k.	Compute postage and freight for parts shipment.	2.8
4.	Control inventory.		2.9
	a.	Use rush orders for breakdown parts.	3.8
	b.	Order out-of-stock parts for customers and repair jobs in shop.	3.7
	c.	Maintain current inventory of parts on control cards or computer printout.	3.5
	d.	Identify fast moving parts for inventory increases.	3.5
	e.	Order parts based on actual and anticipated sales.	3.3
	f.	Order parts to take advantage of volume discounts.	3.2
	g.	Identify new parts in excess of inventory.	3.1
	h.	Conduct annual parts inventory for tax purposes.	3.1
	i.	Maintain current tool and hardware inventory.	2.8
	j.	Survey wholesalers for best prices and service.	2.8
	k.	Dispose of obsolete parts.	2.8
	l.	Use computer to locate parts in other dealerships.	2.5
	m.	Calculate and analyze inventory turnover.	2.5
	n.	Make out computer cards for parts orders.	2.3
	o.	Purchase tools and hardware from salesperson.	1.7
	p.	Cooperate in volume buying with other dealers.	1.5
5.	Keep records.		2.4
	a.	Maintain complete and current parts catalogs and price lists.	3.7
	b.	Adjust parts catalogs to reflect manufacturer's service bulletins.	3.4
	c.	File sales slips as a record of sales.	2.4
	d.	Prepare periodical sales reports for management.	2.0
	e.	Maintain customer credit records.	2.0
	f.	Maintain customer files relating to sales.	1.7
	g.	Process tax exemption data for individual customers.	1.7
6.	Maintain an attractive parts department.		3.3
	a.	Keep parts department clean, neat, and attractive.	3.6
	b.	Maintain equipment and furniture.	3.0

7.	Practice good management.	2.9
a.	Predict seasonal needs for parts and consumable items.	3.2
b.	Advise management on inventory level for parts and consumable items.	3.1
c.	Designate excess and obsolete parts.	3.0
d.	Advise management in determining parts storage space requirements.	2.9
e.	Set prices for items not on manufacturer's price lists.	2.8
f.	Advise management on dealership policy for the parts department.	2.5
g.	Determine price discounts for wholesale and volume sales.	2.5
8.	Develop good work habits and attitudes.	3.6
a.	Honesty and personal integrity.	3.9
b.	Follow dealership policies and procedures.	3.8
c.	Follow directions.	3.8
d.	Courtesy in dealing with customers.	3.8
e.	Initiative for job.	3.7
f.	Dependability and thoroughness in job preferences.	3.7
g.	Accept and carry out responsibility.	3.7
h.	Willingness to learn.	3.7
i.	Harmonious working relationship with co-workers.	3.7
j.	Clean, neat, and well-groomed appearance.	3.6
k.	Positive attitude toward job.	3.6
l.	Enthusiasm for job.	3.6
m.	Perform work assignments to the best of ability.	3.6
n.	Punctuality on job.	3.6
o.	Cooperativeness on the job.	3.6
p.	Regular attendance.	3.6
q.	Loyalty to employer.	3.6
r.	Accept and profit from constructive criticism.	3.5
s.	Follow dealership safety procedures and policies.	3.5
t.	Flexibility to change.	3.4
u.	Willingness to work overtime when needed.	3.4
v.	Alert customers and others to hazardous situations.	3.4
w.	Observe situations or conditions creating hazards.	3.4
x.	Advise management about existing safety hazards, and work to correct them.	3.4
y.	Careful use of tools.	3.1

SMALL ENGINE MECHANIC

Other Titles: Lawn Mower Mechanic, Garden Tractor Mechanic, Mechanic

Job Description:

Persons in this occupation are involved in the care and repair of small gasoline engines. They assemble, disassemble, trouble-shoot and repair small engines up to 20 hp. They are responsible for their tools and keeping job time and parts for the repairs completed. They are also responsible for demonstrating the repaired engines to customers.

Competencies Identified and Validated

N = 31*

	Competencies	Weighted Mean**
1.	Have proficient use of written and oral communication.	3.3
a.	Can communicate with customers.	3.6
b.	Have high school degree or passed equivalent examination.	2.9
c.	Neat appearance. #	
d.	Can receive communication from supervisor. #	
e.	Complete warranty claims forms. #	
2.	Use and maintain parts and service manuals.	3.6
a.	Follow written repair instructions.	3.7
b.	Locate the proper manuals and specifications for specific equipment.	3.6
c.	Read and interpret sketches and diagrams.	3.6
d.	Use common sense. #	
e.	Use microfiche machine. #	
3.	Can use basic office procedures.	2.6
a.	Use the telephone.	2.9
b.	Be familiar with office forms.	2.6
c.	Maintain file of office forms.	2.1
4.	Use and maintain hand and power tools.	3.2
a.	Select the proper hand tools.	3.7
b.	Store and maintain tools.	3.5
c.	Adjust tools.	3.5

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* Responses from 31 Small Engine Repair Shops in 21 states. Survey conducted by Agricultural Engineering Department, University of Maryland, College Park, Maryland 20740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Not included on questionnaire but recommended by some experts surveyed.

	d.	Keep tools clean.	3.5
	e.	Interpret tool operation instructions.	3.3
	f.	Set up and use special application tools.	3.3
	g.	Recondition hand and power tools.	2.6
	h.	Recondition minor problems with power tools.	2.6
5.		Proficient in inspecting and diagnosing malfunctions pertaining to small engines.	3.5
	a.	Diagnose potential cause of engine failure.	3.6
	b.	Use test equipment.	3.5
	c.	Recommend parts needed for engine repair.	3.5
	d.	Interpret maintenance procedures for customers to prevent operating defects.	3.5
	e.	Can operate and visually inspect engines for failure.	3.4
6.		Repair and maintain ignition, charging, and starting systems.	3.5
	a.	Check for sparks.	3.7
	b.	Inspect breaker points.	3.6
	c.	Time ignition system.	3.6
	d.	Test the coil or magneto.	3.6
	e.	Install and adjust spark plugs.	3.6
	f.	Identify parts of system.	3.6
	g.	Inspect for poor electrical connections.	3.5
	h.	Repair starting, ignition, and charging circuits.	3.5
	i.	Repair recoil starting systems.	3.5
	j.	Remove and install alternator and regulator.	3.4
	k.	Install and service battery.	3.4
	l.	Test the generator output.	3.4
	m.	Install and adjust bolts.	3.3
	n.	Adjust the coil air gap on small engines.	3.2
	o.	Test starter armature and field coils.	3.2
	p.	Permanent magnet starters. #	
	q.	Solid state ignition. #	
7.		Repair and maintain governing systems.	3.3
	a.	Adjust for proper engine speed.	3.4
	b.	Service or replace parts for governors.	3.2
	c.	Inspect parts of governor for defects.	3.1
8.		Understand and maintain lubrication systems.	3.4
	a.	Change oil and oil filters.	3.7
	b.	Remove and install oil pumps or oil slingers.	3.5
	c.	Have a basic understanding of prefixes used to identify lubricants.	3.1
9.		Repair and maintain cooling systems.	3.4
	a.	Replace or add filtering screens over air intake.	3.4

# Not included on questionnaire but recommended by some experts surveyed.

	b.	Clean debris from cooling system.	3.4
10.	Repair and maintain gas and LP fuel systems.		2.9
	Gas systems.		3.4
	a.	Service filters.	3.5
	b.	Adjust and clean carburetors.	3.4
	c.	Remove and install fuel pump, lines, and tanks.	3.4
	d.	Clean sediment bowl and screen.	3.4
	e.	Install carburetor repair kits.	3.4
	f.	Remove and install carburetor manifolds.	3.4
	g.	Identify parts of fuel system.	3.2
	h.	Test fuel pump pressure.	3.1
	LP Gas.		2.3
	i.	Service vaporizer.	2.3
	j.	Adjust fuel air mixture.	2.3
	k.	Service fuel hoses and valves.	2.3
	l.	Check and repair leaks.	2.3
	m.	Clean all fuel systems.	2.3
	n.	Replace or refill gas cylinder.	2.1
	o.	Safety lockoff system (indoor operation). #	
11.	Ability to perform major rebuild of 2 and 4 cycle engines.		3.5
	a.	Use torque wrench.	3.7
	b.	Check compression.	3.7
	c.	Clean and inspect engine and engine parts for defects.	3.7
	d.	Install gaskets.	3.6
	e.	Remove and install reed valves where it applies.	3.5
	f.	Disassemble and reassemble engine and accessories.	3.5
	g.	Deglaze and inspect cylinders.	3.5
	h.	Service valves, guides and spring.	3.5
	i.	Use measuring instrument (micrometers).	3.4
	j.	Remove cylinder wall, ridge.	3.3
	k.	Identify parts from different engine manufacturers and engine sizes.	3.3
	l.	Install and ream camshaft bushings.	3.1
12.	Repair and maintain clutch systems.		3.3
	a.	Remove and install clutch assemblies.	3.4
	b.	Inspect clutch assemblies for wear.	3.3
13.	Use OSHA prescribed safety procedures within shop.		3.2
	a.	Use hand and power tools safely.	3.8

# Not included on questionnaire but recommended by some experts surveyed.

b.	Understand portable fire suppression equipment and extinguishers according to OSHA standards.	3.4
c.	Use personal protective equipment according to OSHA standards.	3.3
d.	Understand medical service and first aid procedures according to OSHA standards.	3.0
e.	Use safety color codes and signs for marking physical hazards according to OSHA standards.	2.5

FARM TRACTOR AND EQUIPMENT OPERATOR

Other Titles: Farm Tractor and Machinery Operator, Farm Machine and Equipment Operator.

Job Description:

This person is responsible for the safe operation, adjustment and maintenance of farm tractors and equipment. The Operator drives and controls the tractors and equipment units to store them out of the weather, perform chores, till the soil, and plant, cultivate, and harvest crops. The individual may have other tasks not related to tractor and equipment operation. The Farm Tractor and Equipment Operator may be self-employed, employed by a farm manager, land owner, tenant farmer, or farm implement dealer.

Competencies Identified and Validated

N = 178*

Competencies	Weighted Mean**
1. Understand the components of farm tractor and equipment safety.	3.0
a. Look and listen for signals from parts of the farm tractor and equipment units which indicate problems, and immediately take appropriate action.	3.7
b. Study operator's manual carefully, understand the information furnished, and pay particular attention to the safety precautions listed.	3.6
c. Refuse to have extra riders except in very carefully supervised instructional situations.	3.3
d. Use tractor and equipment protective equipment as appropriate:	3.3
(1) Safety stand when working under any tractor or equipment unit.	3.6
(2) Slow-moving vehicle emblem.	3.5
(3) Adequate water supply when working around anhydrous ammonia.	3.5
(4) Shielding and guarding devices.	3.3
(5) Fire extinguisher.	3.0
(6) Protective cab or frame and safety belt.	2.9

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* Responses from 178 Farm Tractor and Equipment Operators in 28 states. Survey conducted by Department of Agriculture, Illinois State University, Normal, Illinois 61761.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

e. Take actions which will prevent the following tractor and equipment accidents:	3.3
(1) Overturns.	3.7
(2) Second party (helper) accidents.	3.6
(3) Falls	3.4
(4) Common tractor and equipment accidents related to the following:	3.2
(a) Wrap points.	3.5
(b) Pinch points.	3.3
(c) Crush points.	3.3
(d) Free-wheeling parts.	3.3
(e) Shear points.	3.2
(f) Thrown objects.	3.2
(g) Stored energy.	3.1
(h) Pull-in points.	3.0
(5) Collisions with other vehicles.	3.1
f. Learn the various systems for farm tractor and equipment units, and understand the essential functions of each.	3.3
g. Wear clothing which fits well, is free of dangling parts, and is otherwise safe.	3.3
h. Be physically, mentally, and psychologically prepared for the work to be performed.	3.2
i. Learn correct nomenclature for farm tractor and equipment units.	2.9
j. Know and use the standard hand signals for agriculture as appropriate.	2.5
k. Use personal protective equipment as appropriate:	1.9
(1) Safety glasses.	2.2
(2) Gloves.	2.1
(3) Ear muffs or ear plugs.	2.1
(4) Safety shoes.	2.0
(5) Respirator.	1.7
(6) Bump cap.	1.7
(7) Hard hat.	1.6
2. Follow correct pre-operating procedures.	3.5
a. Study, learn, and follow the directions given in the farm tractor and equipment unit operators' manuals with regard to appropriate inspecting, servicing, and adjusting tasks.	3.5
b. Use the correct materials and tools efficiently and safely in performing the appropriate inspecting, servicing, and adjusting tasks.	3.4
3. Start and stop units properly.	3.2

a. Follow the procedures for starting and stopping as specified in the farm tractor and/or equipment unit operators' manuals for:	
(1) Preliminary starting operations.	3.4
(2) Actual starting.	3.3
(3) Actual stopping.	3.2
(4) Checks and adjustments during warm-up.	3.2
(5) Preliminary stopping operations.	3.1
(6) Procedures after stopping.	3.1
4. Control farm tractor and/or equipment unit movement.	3.4
a. Follow the procedures for controlling movement specified in the farm tractor and/or equipment unit operators' manuals with special reference to the following:	
(1) Special situations with certain items of equipment.	3.7
(a) Elevators and overhead power lines.	3.7
(2) Difficult situations (bad weather, on hills and hillsides, near ditches, being stuck, etc.).	3.6
(a) While in motion.	3.7
(b) Starting movement.	3.6
(b) Stopping movement.	3.6
(3) Ordinary situations (good weather, on level, etc.).	3.1
(a) While in motion.	3.2
(b) Stopping movement.	3.1
(c) Starting movement.	3.1
5. Hitch and unhitch properly units which require hitching.	3.2
a. Follow the procedures for hitching and unhitching specified in the operators' manuals which apply with special reference to the following.	
(1) Connecting the remote (hydraulic) cylinder.	3.6
(2) Hitching rear-mounted tractor equipment.	3.4
(3) Connecting the power take-off.	3.3
(4) Hitching rules which apply in many situations.	3.3
(a) Make sure safety pins are in place and that locks and safety catches are fastened.	3.5

(b) Use adequate jacks, hoists, or blocks to position equipment.	3.4
(c) Be sure wheel width adjustment has been made for the work to be done.	3.2
(d) Use proper hardware.	3.2
(5) Attaching trailing equipment to the tractor drawbar.	3.2
(a) Avoid being pinched or crushed by a load-sensing hitch.	3.5
(b) Turn engine off and shift to park or set the parking brake before dismounting to hook up.	3.3
(c) Have drawbar at correct height.	3.2
(d) Position tractor for hitching from the operator's seat.	3.2
(e) Shift to park or set the parking brake before permitting a helper (second party) to go behind the tractor to complete the hitch.	3.1
(f) Don't try to lift heavy equipment by hand. Use jack or stand.	3.1
(6) Unhitching equipment.	3.2
(a) Lower support stands or jacks, or block up equipment, before the equipment is uncoupled.	3.2
(b) Select a good location.	3.1
(7) Hitching to belt-driven equipment.	2.8
(8) Hitching where a tractor is not involved.	2.8
6. Operate unit correctly under field conditions.	3.3
a. Follow the procedures for operating under field conditions as specified in the appropriate operators' manuals with special reference to the following:	
(1) Follow safety precautions when working on level land, especially near ditches.	3.6
(2) Check instruments, and listen and look for trouble.	3.6
(3) Be alert for field obstacles.	3.5
(4) Follow safety precautions when making short turns.	3.5
(5) Turn off engine and disengage all power, then wait until all parts stop before working on tractor or equipment.	3.4
(6) Match gear selection and engine speed with load.	3.4

(7) Make checks before starting field work. 3.3
(8) Use the correct speed for the operation being done. 3.3
(9) Follow safe procedures for getting farm tractor or equipment unstuck in the event it becomes stuck. 3.3
(10) Follow safety precautions when working on slopes. 3.2
(11) Check efficiency of field operation and take necessary actions. 3.1
(12) Prevent a farm tractor or equipment unit from getting stuck. 2.9

7. Operate unit correctly under highway conditions. 3.7

a. Follow the procedures for operating under highway conditions as specified in the appropriate operators' manuals or other authoritative sources.

(1) Follow safety precautions. 3.7
(2) Obey the laws which apply. 3.6

8. Refuel farm tractor or equipment unit correctly. 3.6

a. Follow the procedures for refueling specified in appropriate operators' manuals and other authoritative sources with special reference to the following:

(1) Avoid fire hazards by not refueling when the engine is hot and not allowing anyone to smoke around the gasoline, diesel, or LP-gas refueling operation. 3.7
(2) Keep out dirt and debris. 3.6
(3) Keep out moisture. 3.6

FARM EQUIPMENT SALESMAN

Other Titles: Salesman, Farm Machinery Salesman, Farm Equipment and Machinery Salesman.

Job Description:

An individual in this occupation must have a good knowledge of the types of farming and ranching most common locally and the farm power and equipment needs of the farmers and ranchers; they must get along well with customers; know equipment on hand for sale, its price, time required for replacement and source; can appraise value of used equipment; know methods of financing; can determine customers ability to pay; can operate and demonstrate machinery their business offers for sale; possesses knowledge of competition's equipment; can estimate reasonably accurate future demands for farm equipment locally; is usually employed by owner of the business.

Competencies Identified and Validated

N = 41*

Competencies		Weighted Mean**
1.	Have a good knowledge of farming or ranching.	2.8
a.	Know the power and farm equipment needs of local farmers and ranchers to successfully produce crops or livestock.	3.3
b.	Be able to identify equipment problems of local farmers and ranchers.	2.9
c.	Have an acquaintance of many local farmers or ranchers.	2.7
d.	Understand ethnic groups in farming and ranching, (example - Amish, etc.).	2.2
2.	Possess desirable personal qualities and qualifications.	3.4
a.	Be honest and sincere.	3.8
b.	Demonstrate the ability to get along with others.	3.7
c.	Demonstrate a willingness to work.	3.6
d.	Demonstrate a positive job attitude about the organization when working with fellow employees, potential customers, and customers.	3.6
e.	Demonstrate the ability to project a desirable image for the firm.	3.5

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* Responses from 41 Farm Equipment Salesmen and their Work Supervisors in 9 states. Survey conducted by the Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Demonstrate the ability to work on their own.	3.5
	g.	Maintain a satisfactory attendance record.	3.4
	h.	Demonstrate a willingness to learn or take supervision.	3.4
	i.	Budget time wisely.	3.3
	j.	Demonstrate the ability to follow directions of supervisor.	3.2
	k.	Demonstrate acceptable personal appearance and personal hygiene.	3.2
	l.	Accept routine tasks without becoming disinterested.	3.0
3.	Practice good human relations.		3.4
	a.	Keep customer's financial records confidential.	3.6
	b.	Be a good listener.	3.4
	c.	See and report the customer's point of view.	3.1
4.	Develop skill in salesmanship and selling.		3.2
	a.	Match customer's real and perceived needs with resources available within the dealership.	3.3
	b.	Identify customer's perceived needs.	3.2
	c.	Identify customer's real needs.	3.2
	d.	Counsel with customer relative to perceived and real needs in a positive and helpful manner.	3.2
	e.	Demonstrate the techniques of successful farm and ranch calls.	3.1
	f.	Demonstrate the use of different types of sales techniques (phone, face-to-face).	3.0
5.	Know ways farm equipment can be financed.		2.7
	a.	Evaluate customer risk and ability to pay.	2.9
	b.	Interpret the financial statement of a customer.	2.8
	c.	Understand taxes and tax advantages.	2.8
	d.	Compute the cost of granting credit.	2.7
	e.	Identify and recommend sources of credit available in the community.	2.6
6.	Accurately appraise value of used equipment.		3.1
	a.	Be reasonably accurate of re-sale value and market.	3.3
	b.	Recognize needed repairs of used equipment and costs to recondition it.	3.1
	c.	Know mark-up of new equipment over cost.	3.0
	d.	Determine if used equipment had good or poor maintenance by owner.	2.9

7.	Have knowledge of equipment on hand and sources of a re-supply.	2.8
a.	Know where equipment for sale is located or stored in the business.	3.3
b.	Know time required for stock replacement.	2.6
c.	Know sources for re-ordering stock.	2.5
8.	Operate properly the equipment offered for sale.	3.1
a.	Know proper operation/adjustment of equipment.	3.1
b.	Demonstrate equipment operation, adjustment, and maintenance.	3.1
9.	Estimate reasonably close future market for farm equipment.	2.9
a.	Know items in greatest demand.	3.0
b.	Be sensitive to market trends.	2.9
10.	Have good knowledge of competition's equipment.	2.6
a.	Know their strong and weak points.	3.1
b.	Know prices of competitor's equipment.	2.5
c.	Have general knowledge of their equipment inventories.	2.2
11.	Know how to effectively advertise and promote the sale of equipment.	2.3
a.	Identify potential customers from market studies.	2.4
b.	Organize and conduct sales meetings.	2.3
c.	Develop displays.	2.3
d.	Prepare advertising for newspapers, radio, and television.	2.0

IRRIGATION TECHNICIAN

Other Titles: Ditch Tender, Irrigator-Sprinkler System, Irrigator-Stand Pipe, Irrigator - Valve Pipe, Ditch Rider.

Job Description:

Inspects area irrigated to insure adequate soaking and prevent waste of water. Opens head gate to permit entry of water into main ditches. Directs workers in cleaning and repairing ditches. Lays out and connects pipe along designated pipeline settings in the field. Operates revolving sprinklers in the field. Operates pumping system to irrigate crops. Observes revolving sprinklers to insure uniform distribution of water to all areas. Attaches vertical pipes to underground pipeline system to irrigate crops. Observes rate of flow and adjusts valves accordingly. Shovels soil into holes and low spots in levees and removes obstructions. Digs opening in embankment at end of row to direct overflow of water into spillway. Builds levees to prevent water from overflowing other crops or highways. Lubricates pumping equipment and makes minor repairs. Records daily weather data. Accurately takes soil moisture tests, and has a knowledge of crops and their moisture requirements.

Competencies Identified and Validated

N = 62*

Competencies	Weighted Mean**
1. Operate sprinkler system.	3.3
a. Operate sprinkler system for a specified time.	3.6
b. Adjust continuously operating irrigation system to correct pressure for every location.	3.3
c. Turn valves.	3.2
d. Check gauges.	3.2
e. Change valves.	3.2
2. Perform maintenance activities.	3.2
a. Replace broken pipe.	3.4
b. Clean sprinklers.	3.3
c. Repair broken valves.	3.3
d. Dig up and repair underground valves.	3.3

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* Responses from 62 Irrigation Technicians in 30 states. Survey conducted by Department of Agricultural Education, California Polytechnic State University, San Luis Obispo, California 93401.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

e.	Repair stabilizers.	3.2
f.	Disassemble sprinkler systems.	3.1
3.	Lay out sprinkler systems.	3.1
a.	Assemble and maintain piping systems and fixtures.	3.2
b.	Install sprinkler heads.	3.2
c.	Inspect line for leaks.	3.0
d.	Design and install irrigation equipment in new areas.	2.9
4.	Distribute water into irrigation system.	2.9
a.	Regulate irrigation system to convey water to farms in assigned area.	3.5
b.	Contact water users to determine quantity of water needed, and time and duration of delivery.	2.9
c.	Operate gates, checks and turnouts to regulate waterflow into canals and laterals.	2.8
d.	Calculate and record quantities of water delivered for use in computing charges to farmers.	2.6
5.	Patrol and inspect irrigation system.	2.8
a.	Supervise crew workers cleaning ditches, raising ditch banks, repairing concrete and wooden structures, and erecting fences and gates.	3.1
b.	Fill holes and exterminate rodents.	3.0
c.	Patrol assigned area by foot, horseback, or motor vehicle to detect leaks, breaks, weak areas, obstructions, and damage to irrigation systems.	2.9
d.	Remove debris and make emergency repairs to banks, structures, gates, and canal roads.	2.9
e.	Prepare reports on condition of system and equipment, and replacements or repairs needed.	2.5
f.	Patrol canal at night to determine that water is flowing in prescribed volume into users ditches.	2.2
6.	Provide data for irrigation system.	2.6
a.	Recognize specific growth stage of crops. and their irrigation requirements.	3.0
b.	Check soil moisture conditions.	3.0
c.	Record and plot daily weather data and keep in adjustment all instruments at the climatic stations.	2.6

	d.	Obtain information on wind and rainfall conditions.	2.4
	e.	Change weekly weather charts.	2.2
7.		Operate irrigation pumps.	2.4
	a.	Perform maintenance activities in the pumping plant.	2.7
	b.	Select correct motor for type of pump.	2.2
	c.	Repair and adjust motors.	2.2

AGRICULTURAL PRODUCTS PROCESSING AND MARKETING

Most agricultural products must be processed before they are ready for sale and consumption. Scme agricultural products are processed on the farm or ranch where produced, however, most are sold to businesses or industries who process and prepare the product for sale.

The occupations in Agricultural Products Processing and Marketing surveyed in this study follow.

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Food		
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Sweet Potatoes	Sweet Potato Processor	396
Non-Food		
Wool	Wool Buyer	398
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FLOUR MILLER'S ASSISTANT

Job Description:

Accurately set up and adjust cleaning house and pre-temper machinery and equipment to pull wheat from designated bins at required speeds and volume, clean, attain designated tempering and moisture content and store as directed; maintain continuing careful review of cleaning house and mill operation; accurately record status on bin boards and reports. Operate elevator wheat scales. Constantly seek out possible trouble areas, determine and remedy cause and/or immediately report. Grease and oil, make general mill repairs, run specified sampling tests, open and close and keep assigned areas clean. Assist miller and perform special assignments. Efficiently plan and carry out work; make frequent minor decisions. Take an active responsibility in processing, packing, and shipping to insure a food-safe product. The physical effort is usually light for the balance of duties to moderate when clearing chokes and cleaning out sifters. The individual is subject to possible injury when helping to replace drive belts and when climbing and working on ladders. It is moderately humid and fairly warm in some work areas. There is also considerable noise from machinery and ear-protective equipment must often be worn.

Competencies Identified and Validated

N = 25*

Competencies		Weighted Mean**
1.	Inspection.	3.4
a.	Check machinery and equipment functioning and wheat supply flow.	3.9
b.	Adjust machinery and equipment to correct for delivery of designated grain and tempered grade.	3.9
c.	Make thorough inspection of wheat cleaning plant several times daily.	3.8
d.	Check water flow meters and adjust as needed for maintenance of specified water delivery level.	3.8
e.	Anticipate and shut off filled bins or move contents on to next stage.	3.1

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* Responses from 25 Flour Miller's Assistants in 15 states. Survey conducted by Department of Agricultural Education, California State Polytechnic University, Pomona, California 91768.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

f.	Visually check and measure specified grain and tempering bins; adjust equipment to correct flow as required.	3.7
g.	Look for holes in cleaning equipment, screen and screening sifters.	3.6
h.	Inspect and adjust equipment as necessary.	3.5
i.	Look for chokes visually, by feeling of stocking, hitting equipment with mallets, determine cause, clear and report.	3.5
j.	Feel and smell motor for possible overheating.	3.4
k.	Obtain specified wheat samples and labels.	3.4
l.	Operate moisture tester.	3.4
m.	Add oil if needed.	3.3
n.	Remove handfuls of grain from designated equipment, feel and smell; immediately report any abnormal condition.	3.3
o.	Check lights on cleaning plant panel board to be sure scheduled equipment is functioning; investigate and report irregularities.	3.3
p.	Patch or replace screening.	3.2
q.	Look for leaks in spouting and stockings.	3.1
(1)	Patch	3.2
(2)	Enter on report.	3.0
r.	Look for leaks.	3.1
s.	Remove screening sample and retain hourly.	2.8
t.	Air out bulk bins when required.	2.3
2.	Operate pre-temper system.	3.1
a.	Start and stop equipment.	3.6
b.	Set water controls.	3.5
(1)	Check moisture content.	3.6
(2)	Adjust to obtain required moisture level.	3.5
c.	Handle paperwork; record information.	3.3
d.	Open and close, adjust diamond slide for wheat flow.	3.2
e.	Clean grate and paddle mixer.	2.8
f.	Weigh wheat and make scale tickets.	2.6
3.	Maintenance.	2.9
a.	Oil machinery and equipment.	3.1
b.	Change rolls in roller mills.	2.8
4.	Help head miller with operation.	3.4
a.	Start up.	3.7
b.	Shut down.	3.7
c.	Emergency situations.	3.7
d.	General operation of mill.	3.5
e.	Connect hoses and electrical interlocking controls from mill streams to bulk storage.	2.9
f.	Manually select flour streams to make designated grades.	2.9

5. Clean up.	3.3
a. Keep work areas cleared and neat.	3.6
b. Keep assigned areas swept up and clean.	3.4
c. Check and dispose of trash from scalperator and millerator.	2.8
6. Other.	3.5
a. Create and maintain safety attitudes and practices.	3.7
b. Be able to work in hot and humid conditions.	3.4
c. Be in good physical condition.	3.3

CEREAL GRAINS - LABORER

Other Titles: Unloader, Loader, Clean-up Man, Sweeper.

Job Description:

The responsibilities of this position are to maintain a clean milling operation, to load and unload trucks or box cars with the various commodities, to provide the heavy manual labor and to assist wherever directed or needed in any part of the operation. The work is heavy, hot, dusty, humid, and noisy. Protective equipment must often be worn.

Competencies Identified and Validated

N = 34*

Competencies	Weighted Mean**
1. Unloading.	3.4
a. Unload using the following:	3.3
(1) Auger elevator system.	3.5
(2) Moorman system.	3.2
b. Clean up around pits.	3.5
c. Sweep trucks or cars out and prepare for next load.	3.4
d. Clean up around auger.	3.4
e. Bring truck or box car up.	3.3
2. Physical condition.	3.6
a. Must be in good physical condition.	3.6
b. Work in heat and humidity.	3.6
c. Do heavy work.	3.5
3. Equipment skills.	2.6
a. Forklift.	2.8
b. Hydraulic system on trucks.	2.6
c. Skip loader.	2.5
4. General.	2.6
a. Clean up spill overs.	3.4
b. Sweep up general area.	3.3
c. Weigh barley.	2.4
d. Wash trucks.	1.9
e. Pull weeds.	1.8
f. Inspect and grade ingredients.#	

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* Responses from 34 Laborers in 10 states. Survey conducted by Department of Agricultural Education, California State Polytechnic University, Pomona, California 91768.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Not included on questionnaire but recommended by some experts surveyed.

CEREAL GRAINS - PRODUCTION COORDINATOR, DISPATCHER

Job Description:

To oversee the operation in general and be sure that all orders are ready and delivered on time. Primary supervisory responsibilities are over the bulk delivery drivers, mixer man, pellet operator, and barley roller operator. The position requires a fair amount of paperwork and public relations. The work is light but very demanding.

Competencies Identified and Validated

N = 34*

Competencies		Weighted Mean**
1.	Know duties of all employees.	2.5
	a. Pellet mill operator.	3.0
	b. Mixer man.	2.9
	c. Truck driver.	2.7
	d. Barley roller operator.	2.6
	e. Unloader or loader.	2.4
	f. Maintenance man.	2.3
	g. Mechanic.	2.3
	h. Clean-up man.	2.3
	i. Salesman.	2.2
2.	Practice good public relations.	2.7
	a. Visit customers to explain reasons for problems with their orders.	2.7
	b. Check with customers to see when they will need another delivery.	2.7
3.	Keep records.	3.1
	a. Record all drugs used in feeds.	3.6
	b. Keep record of all deliveries.	3.3
	c. Comment of drivers of delivery trucks.	3.2
	d. Duplicate invoices.	3.0
	e. Record all safety meetings.	3.0
	f. Keep customer record book up to date.	2.8
	g. Project delivery dates for steady customers to be sure they don't run out.	2.9
4.	Practice safety and demand it from all workers.	3.4
	a. Make sure men wear all the company provided safety equipment.	3.5

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* Responses from 34 Production Coordinators in 10 states. Survey conducted by Department of Agricultural Education, California State Polytechnic University, Pomona, California 91768.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Keep first aid kit stocked.	3.4
c.	See that all equipment is in good operating condition: belts are on right and augers covered, etc.	3.2
5.	Supervise workers.	3.2
a.	Drivers.	3.4
(1)	See that delivery is on time.	3.7
(2)	Line up loads.	3.5
(3)	Check with driver for customer needs or comments.	3.3
b.	Mixer man to see that the formula has been followed.	3.3
c.	Pellet mill to see that pellets are coming out right.	3.1
d.	Barley roller to see that things are correct there.	2.6
6.	Be able to operate all equipment.	2.4
a.	Forklift.	2.6
b.	Skip loader.	2.6
c.	Elevators.	2.6
d.	Trucks.	2.6
e.	Morrman board system.	2.5
f.	Augers.	2.5
g.	Pellet mill.	2.5
h.	Hydraulic lift.	2.2
i.	Barley roller.	2.2
j.	Semi-automatic electric mixer.	2.1
7.	Be familiar with mill products and processes.	3.2
a.	Consistency of feed.	3.7
b.	Feed formulas.	3.5
c.	Know amount of steam that should be used in pelleting by feel.	2.9
d.	Can tell molasses content by feel.	2.8
8.	Be in good physical condition.	3.0
a.	Is in good physical condition.	3.0
b.	Is not subject to stress.	3.0
9.	Other.	2.9
a.	See that all equipment is maintained and repaired.	3.1
b.	Have the ability to get along well with the following.	3.0
(1)	Salesmen.	3.3
(2)	Drivers.	2.8
(3)	Mill operators.	2.7
c.	Subject to 24-hour recall.	2.7

CEREAL GRAINS - MILL MAINTENANCE MAN

Job Description:

Maintain required supply of normally used maintenance supplies; issue requisitions and place orders with suppliers as needed or directed. Receive and inspect incoming machinery and equipment; immediately report discrepancies and/or damage. Carefully inspect mill, seeking possible trouble areas; repair and replace broken drive belts and make general mill repairs. Grease and oil the mill. The work is greasy, dirty, sometimes dusty, and subject to serious injury working with moving machinery, hand and power tools, ladders and elevated platforms. It is noisy and ear-protective equipment is worn when required. The physical effort is moderate to heavy. Continual use of hands, arms, eyes, feet, and legs. Considerable climbing, twisting, bending, standing, lifting, pushing, and carrying tools and materials.

Competencies Identified and Validated

N = 57*

Competencies	Weighted Mean**
1. Be familiar with maintenance supplies and suppliers.	2.8
a. Know all normally used maintenance supplies.	3.4
b. Be familiar with parts catalogs.	3.0
c. Know when to order supplies to maintain proper level.	2.9
d. Fill out requisition forms and place orders with suppliers.	2.4
e. Maintain harmonious relations with suppliers of maintenance items.	2.2
2. Be in good physical condition.	3.4
a. Be in good physical condition.	3.6
b. Have a low accident record.	3.5
c. Be able to work in hot and humid conditions.	3.4
d. Can carry, push, pull, etc., heavy loads.	3.3
e. Have no serious injuries to knees, back, etc.	3.3
3. Inspect and maintain mill as scheduled or directed.	3.1
a. Keep watch on fire equipment to be sure it is operational.	3.6

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* Responses from 57 Mill Maintenance Men in 22 states. Survey conducted by Department of Agricultural Education, California State Polytechnic University, Pomona, California 91768.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Maintain proper grease and oil in all equipment and machinery.	3.5
c.	Have ability to feel, smell, hear, and visually spot trouble areas.	3.4
d.	Look for broken drive belts and repair them.	3.4
e.	Help maintain neat and orderly maintenance shop area.	3.3
f.	Make temporary minor electrical repairs.	3.3
g.	Maintain records of maintenance and repair of machinery and equipment.	3.2
h.	Complete required personal daily maintenance activity reports.	3.0
i.	Look for holes or leaks in spouting and stocking and immediately report same.	3.0
j.	Look for chokes visually, by feeling of stocking, hitting equipment with rubber mallet, etc., and clears.	2.6
k.	Shovel up flour or feed spill overs as time permits.	2.1
4.	Have ability to use equipment.	3.0
a.	Oxy-acetylene welding.	3.6
b.	Electrical welding in all positions.	3.5
c.	Drill press.	3.4
d.	Table saw.	3.4
e.	Power hacksaw.	2.9
f.	Lathe.	2.2
g.	Forklift.	2.1
5.	Have knowledge of all machinery and building installations.	3.0
a.	Plant machinery equipment and facilities.	3.6
	(1) Repairs.	3.7
	(2) Dismantles.	3.6
	(3) Assembles.	3.6
	(4) Adjusts.	3.6
	(5) Installs.	3.6
	(6) Helps devise improvements.	3.4
b.	Install new equipment and machinery in accordance with prescribed blueprints.	3.4
c.	Have general knowledge of all processing and mixing equipment.	3.3
d.	Make any installation not considered capital or new installation.	3.2
e.	Build from scratch some kinds of milling equipment per company plans.	3.0
f.	Read blueprints.	3.0
g.	Fabricate.	2.8
	(1) Safety devices.	3.0
	(2) Hoppers.	2.9
	(3) Platforms.	2.9

(4) Metal plates.	2.9
(5) Pans.	2.8
(6) Conveyers.	2.7
(7) Shafts.	2.5
(8) Sifters.	2.5
h. Repair and rebuild concrete walls, floors, and windows.	2.8
i. Cut sheet metal according to pattern, bends, and folds, solders, and/or rivets.	2.7
j. Build walls, cabinets, doors, and other needed carpentering within the mill.	2.6
k. Draw up patterns for sheet metal construction.	2.6
6. Other.	3.3
a. Create and maintain safety attitudes and practices.	3.6
b. Subject to call back or call in twenty-four hours a day.	3.6
c. Receives and inspects incoming machinery and equipment.	3.3
d. Take an active responsibility in processing, packing, and shipping to insure a food-safe product.	3.3

CITRUS PROCESSOR

Other Titles: Citrus Concentrate Worker, Citrus Processing Equipment Operator, Citrus Processing Worker.

Job Description:

Persons employed in Citrus Processing should be competent in one or more of several different job areas including: servicing and operation of citrus processing equipment, repair and maintenance of citrus processing equipment, quality control of concentrate, sectionizing operations, packaging and loading operations, and feed mill operation. Persons contemplating employment should have a general knowledge of all of the above job areas preferably with special knowledge and skills in at least one area. At the job entry level persons employed should be able to work as assigned with only a minimum of induction training and supervision.

Competencies Identified and Validated

N = 50*

Competencies	Weighted Mean**
1. Service and operate equipment used in manufacturing citrus concentrate.	2.4
a. Evaporator.	3.2
b. Forklift.	2.7
c. Finisher.	2.7
d. Capping machine.	2.6
e. Filler.	2.5
f. Switchboard.	2.1
g. Casing machine.	2.1
h. Palletizer and depalletizer.	2.1
i. Box machine.	1.9
2. Service and operate equipment used in the manufacturing of single strength juices.	2.4
a. Pasteurizer - deoiler.	2.8
b. Closing machine.	2.6
c. Forklift.	2.5
d. Filler.	2.4
e. Label machine.	2.3

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* Responses from 50 Citrus Processors in Florida. Survey conducted by the Department of Agriculture and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Palletizer and depalletizer.	2.3
	g.	Casing machine.	2.2
3.		Conduct tests as necessary for quality control.	3.1
	a.	Bacteria test.	3.3
	b.	Sample analysis.	3.3
	c.	Weight and fill test.	2.8
4.		Repair and maintain citrus processing equipment.	3.1
	a.	Understand and make repairs on three phase electric motors and control systems.	3.4
	b.	Understand basic principles of mechanics.	3.2
	c.	Know principles of refrigeration and ammonia systems.	3.2
	d.	Repair refrigeration units and maintain within required temperature levels.	3.2
	e.	Read and understand blueprints.	3.1
	f.	Analyze and repair various types of pumps and conveyor systems.	3.1
	g.	Rebuild electric motors.	2.9
5.		Carry out required warehousing operations.	2.8
	a.	Know warehousing procedures and keep all items in good order.	2.9
	b.	Know inventory procedures and inventory products as required.	2.9
	c.	Package products in accordance with specifications using appropriate machines.	2.8
	d.	Check cases and make certain of accuracy for all orders processed.	2.7
6.		Have knowledge of sectionizing process and be able to demonstrate.	2.3
	a.	Use of capper.	2.4
	b.	Machine sectionizing.	2.3
	c.	Use of peeling machine.	2.3
	d.	Hand sectionizing.	2.2
7.		Perform special feed mill skills as required.	2.6
	a.	Operate dryer.	2.9
	b.	Operate evaporator.	2.9
	c.	Operate press.	2.6
	d.	Drive tractor.	2.1
8.		Know and operate boiler and waste water treatment facility.	3.2
	a.	Waste water treatment specialist.	3.3
	b.	Boiler operator.	3.2

PRODUCTION SUPERVISOR

Other Titles: Foreman, Plant Superintendent, Plant Manager.

Job Description:

The production supervisor determines the uses to be made of milk received daily; keeps records of incoming milk and outgoing dairy products; is responsible for sanitary conditions and cleanliness of equipment; schedule repairs to buildings and equipment; purchases supplies and controls plant inventory; and is responsible to regulatory officials including public health, OSHA, and others.

Competencies Identified and Validated

N = 40*

	Competencies	Weighted Mean**
1.	Inspect equipment daily and make sure it is in good repair, is clean and sanitized.	3.5
2.	Determine daily use of milk into milk and milk products.	3.4
3.	Record incoming milk and outgoing milk products daily.	3.3
4.	Keep record of quality control.	3.3
5.	Schedule employee's work, vacations, and substitute workers.	3.3
6.	Responsible to regulatory officials (local, state, national) such as public health, OSHA, etc.	3.3
7.	Keep inventory of stock and supplies.	3.0
8.	Review job classification and performance of employees.	3.0
9.	Purchase supplies.	2.8
10.	Schedule maintenance and repair.	2.8
11.	Interview prospective employees.	2.7
12.	Plan for future expansion, renovation, and equipment replacement.	2.5

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* Responses from 40 Production Supervisors in 9 states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

MILK PROCESSOR

Other Titles: Pasteurizer, Tester, Separator, Homogenizer.

Job Description:

Under the supervision of the plant superintendent, the Milk Processor operates all milk processing equipment, is responsible for sanitizing and cleaning the equipment, and for performing minor repairs and adjustments. They supervise the work of the employees in the processing, packaging, and storing of milk products. They keep records of milk processed, supplies on hand, and report needs to the plant superintendent.

Competencies Identified and Validated

N = 39*

	Competencies	Weighted Mean**
1.	Operate milk processing equipment including H.T.S.T., Homogenizer, separator, pasteurizing vats, storage vats, packaging equipment, and C.I.P. cleaning equipment.	3.8
2.	Sanitize and clean equipment as necessary.	3.5
3.	Standardize milk by obtaining fat test and adding skim milk in correct required amount to obtain specified fat content level.	3.5
4.	Check equipment for malfunction. Report service requirements to plant superintendent.	3.3
5.	Calculate the amounts of ingredients needed to make up various by-products such as chocolate milk, buttermilk, half and half, and various cheeses.	3.2
6.	Take proper milk and by-product samples as directed by the plant's laboratory personnel.	3.2
7.	Prepare daily production records.	3.1
8.	Instruct and direct work of other employees in the production, packaging, and storing of milk products.	3.0
9.	Perform minor repairs and adjustments to equipment as required.	2.7
10.	Distribute milk to other departments as required.	2.5
11.	May test for butterfat content of milk.	2.5
12.	Inventory equipment supplies on hand and report needs to plant superintendent.	2.3

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* Responses from 39 Milk Processors in eight states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

DAIRY PLANT HELPER

Other Titles: Filler Operator, Evaporator Operator, Loader and Checker, Product Load Dispenser, By-Products Processor, Cold Storage Operator, Clean-up Personnel, Equipment and Fluid Flow Sanitarians, General Helper, Assistant Maintenance Helper, Electrician, Dairy Plant Worker.

Job Description:

Under the supervision of the dairy processing plant's product supervisors, helps process milk, make ice cream, cheese, butter, or other products where help is needed. Do work as assigned.

Competencies Identified and Validated

N = 41*

	Competencies	Weighted Mean**
1.	Follow instructions of supervisors.	3.9
2.	Practice safety in all activities.	3.7
3.	Report to supervisor malfunction of equipment and any unusual conditions which may arise in the work.	3.5
4.	Have ability to work harmoniously with fellow workers.	3.4
5.	Assist in operating and cleaning equipment.	3.4
6.	Maintain records as assigned.	3.1
7.	Report to supervisors supplies and equipment needed.	3.0

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* Responses from 41 Dairy Plant Helpers in 9 states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

SALESROOM SALES PERSON

Other Titles: Salesroom Attendant, Salesroom Clerk.

Job Description:

Under the supervision of the plant superintendent, this person supervises the sale of dairy products to customers and the general overall management of the salesroom. They must keep accurate records of receipts from sales and of products sold. They must maintain an adequate supply of products to be sold in the sales room. They supervise the cleaning of the salesroom and of its equipment.

Competencies Identified and Validated

N = 20*

Competencies	Weighted Mean**
1. Account for money in cash registers and obtain additional change from plant office as required.	3.5
2. Responsible for good public image.	3.5
3. Supervise the sale of products retailed through the plant's salesroom.	3.4
4. Order merchandise sold in salesroom including dairy products, miscellaneous items, etc.	3.2
5. Take monthly inventories and submit reports to the plant office.	3.1
6. Check equipment in the salesroom and report malfunctions and service requirements to the maintenance engineer or plant superintendent.	3.0
7. Supervise and schedule employees necessary for the operation of the salesroom; contact and assign part-time employees as required.	3.0
8. Inventory supplies such as napkins, cups, dishes, spoons and cleaning supplies and report to Plant Superintendent when new supplies are needed.	2.8
9. Supervise the cleaning of the salesroom and its equipment.	2.8
10. Cut, weigh and price various cheeses and supervise their packaging, storage or display.	2.7
11. Assist with the serving of retail customers during employee breaks, lunch hours or as needed.	2.5

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* Responses from 20 Salesroom Sales Persons in five states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

DAIRY PRODUCTS SALESMAN AND MILK TRUCK DRIVER

Other Titles: Driver, Salesman, Milk Truck Driver,
Route Salesman, Route Driver.

Job Description:

The person in this occupation usually fills orders for processed dairy products from wholesale customers. Some retail dairy products to homes in addition to stores following a regular route weekly, bi-weekly, or more often. They load their truck with dairy products previously ordered and make deliveries. The care and maintenance of the truck may or may not be their responsibility. They keep a record of receipts from sales and deliveries.

Competencies Identified and Validated

N = 34*

	Competencies	Weighted Mean**
1.	Operate delivery truck to deliver market milk and other dairy products to retail or wholesale customers.	3.8
2.	Obtain signature for receipt of goods and return signed copies to office.	3.7
3.	Fill store and other wholesale orders for milk, cream, butter, cottage cheese, and other wholesale products; accumulate order and load onto truck daily.	3.6
4.	Pick up empty cases, cans, etc. and return to dairy plant.	3.4
5.	Report need of major repairs or service to plant supervisor.	3.2
6.	Report unusual conditions to supervisor.	3.1
7.	Perform other duties related or similar to the type described above.	2.6
8.	Service truck with gas and oil; check radiator, battery, and oil levels; insure that truck is lubricated periodically; clean and wash truck as necessary.	2.5
9.	Pick up supplies from local stores as directed.	1.8
10.	Assist as directed in various rooms in dairy plant.	1.1

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* Responses from 34 Dairy Products Salesman and Milk Truck Drivers in six states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

BUTTER MAKER

Other Titles: Churn Operator, Butter Operator

Job Description:

Under the supervision of the plant superintendent, make butter from cream collected in the plant. Cut butter into prints and patties and store. Wash and sanitize butter making equipment.

Competencies Identified and Validated

N = 12*

	Competencies	Weighted Mean**
1.	Collect and dump cream into vat. Test for acidity and standardize when required.	3.2
2.	Pasteurize cream and cool. Draw off into churn. Add color if required.	3.3
3.	Operate churn. Draw off buttermilk.	3.5
4.	Wash and work butter. Remove from churn.	2.9
5.	Place butter in cooler. Cut prints and patties.	2.6
6.	Wash and sanitize butter making equipment.	3.3
7.	Knowledge of mechanical processing and cutting equipment. #	

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* Responses from 12 Butter Makers in four states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

# Not included on questionnaire but recommended by some experts surveyed.

ICE CREAM MAKER

Other Titles: Mix Man, Ice Cream Supervisor, Production Supervisor, Frozen Dessert Supervisor.

Job Description:

The Ice Cream Maker is responsible to the Dairy Plant Superintendent but has overall responsibility for the production of ice cream and sherberts. Determines amount of product to produce; stores product; cleans and sanitizes equipment; keeps inventory of product and supplies. Is often responsible for the supervision of several employees who work under their direction.

Competencies Identified and Validated

N = 26*

Competencies	Weighted Mean**
1. Have overall responsibility for the ice cream room and the production of ice cream.	3.5
2. Accurately calculate mixes.	3.4
3. Supervise the mixing, freezing, packaging, and storing of ice cream and sherbert.	3.4
4. Clean and sanitize equipment.	3.4
5. Determine amounts of product to prepare to meet customer's requirements.	3.1
6. Maintain product inventories.	3.0
7. Insure that proper safety procedures are followed in all production areas.	3.0
8. Check equipment for malfunctioning, and identify adjustments and repairs needed.	2.8
9. Receive shipments of supplies; directs unloading, and verification of items, and proper storage.	2.6

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* Responses from 26 Ice Cream Makers in four states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 39740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

CHEESE MAKER

Other Titles: Cultured Products Operator

Job Description:

The Cheese Maker operates all equipment necessary for the production of the kinds of cheese made in the plant; they age, package, and store cheese; clean cheese making equipment; maintain work area in a clean sanitary condition; instruct and direct the work of helpers as needed. They take and deliver to the plant laboratory samples of cheese for analysis.

Competencies Identified and Validated

N = 23*

Competencies	Weighted Mean**
1. Operate various equipment necessary for the production of cheese such as homogenizer, pasteurizing vats, milling machine, dryers, presses and aging rooms. Sanitize and clean equipment as necessary.	3.4
2. Determine ingredients necessary for production of various cheeses such as cottage cheese, cheddar cheese, romano cheese, brick cheese, trappist cheese, cream cheese, cheese spreads, sour cream, etc.	3.4
3. Prepare cheeses, checking cutting points, cooking items and temperatures following standardized procedures.	3.6
4. Check cheeses for proper aging and determine when each is to be moved from aging room.	2.9
5. Pack and store finished products; check cheese orders which are packed for delivery.	2.6
6. Check equipment located in cheese area and report malfunctions and service requirements to the maintenance engineer or the plant superintendent. Perform minor repairs and adjustments, as required.	2.9
7. Maintain work area in a clean and sanitary condition.	3.6
8. Instruct and direct the work of other employees in the production, packaging, and storing of cheeses.	2.9
9. Take necessary samples required by the plant laboratory for analysis and deliver to the laboratory.	2.9
10. Maintain proper cheese room supplies and report needs to plant superintendent.	2.7

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* Responses from 23 Cheese Makers in seven states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

MAINTENANCE ENGINEER

Other Titles: Engineer, Mechanic, Maintenance and Refrigeration Engineer, Electrician, Physical Plant Supervisor, Physical Plant Engineer, Plant Engineer

Job Description:

The Maintenance Engineer performs a variety of duties related to the installation, maintenance and repair of equipment in the dairy processing plant. They lay out work and make electrical, mechanical, and plumbing repairs and connections to equipment as needed. They inspect all utilities equipment for proper operation such as gas, water, electricity, and sewer drainage. They safely use and properly store hand and power tools used in their work. They inform the plant superintendent of needed supplies and equipment. They may direct the work of helpers.

Competencies Identified and Validated

N = 41*

	Competencies	Weighted Mean**
1.	Install, maintain and repair all milk processing equipment in the plant, including refrigeration systems and equipment.	3.8
2.	Insure proper operation of dairy plant equipment daily.	3.7
3.	Inspect refrigeration and cooling systems and equipment for proper operation. Perform necessary repairs and maintenance.	3.6
4.	Maintain steam and hot water systems.	3.5
5.	Direct work of helpers.	3.4
6.	Make repairs on all utilities needed in the plant including water, gas, electricity, and sewers or drainage facilities.	3.4
7.	Use hand and power tools safely such as lathe, drill press, welder; etc., in the performance of duties.	3.4
8.	Inform plant superintendent of needed supplies and equipment.	3.2
9.	Store, sharpen, and maintain hand and power tools used in work in excellent condition.	3.2
10.	Repair motors within capabilities of the shop.	3.0

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* Responses from 41 Maintenance Engineers in 9 states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

11.	Replace water filters when needed.	2.9
12.	Check water softness and recondition as necessary.	2.8
13.	Check blueprints for construction, repair, or remodeling of the plant. Report errors, misprints and make suggestions for changes.	2.7

LABORATORY TECHNICIAN

Other Titles: Quality Control Supervisor, Microbiologist.

Job Description:

The Laboratory Technician determines the percentage of butter fat in milk of suppliers and determines price for payment; determines fat and solids for products to be sold; performs bacteriological analysis on raw and processed dairy products to insure compliance with state and federal standards; cares for various bacterial cultures used in dairy products; maintains accurate detailed records on analysis of products and operational condition of equipment; submits analysis reports as required.

Competencies Identified and Validated

N = 37*

	Competencies	Weighted Mean**
1.	Determine fat and solids on products to be sold to insure compliance with state and federal requlations and stndards.	3.8
2.	Perform bacteriological analyses on raw and processed dairy products to insure compliance with state and federal standards.	3.6
3.	Maintain laboratory and laboratory procedures to comply with both state and federal approved laboratory licensing program.	3.6
4.	Determine the percentage of butter fat in milk of suppliers to establish a price for payment.	3.5
5.	Maintain accurate detailed records on analysis of products and operational conditions of equipment.	3.5
6.	Perform other laboratory procedures as required.	3.4
7.	Submit daily analysis reports to the plant superintendent and monthly reports as required.	3.4
8.	Transfer and care for various bacterial cultures.	3.0
9.	Maintain inventory of laboratory supplies and materials and reorders as necessary.	3.0
10.	Perform analysis to determine the strength of cleaning and sanitizing solutions and the hardness of water.	2.8
11.	Perform freezing point determination analysis on the milk cryoscope.	2.7
12.	Operate the Mojonnier tester to accurately determine fat and solids on various products.	2.5

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* Responses from 37 Laboratory Technicians in nine states. Survey conducted by Department of Agricultural Education, California State University, Fresno, California 93740.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

PLANT ELECTRICIAN

(Fruit and Vegetable Processing Industry)

Other Titles: Maintenance Electrician, Operation Engineer, Mechanic I - Electrician.

Job Description:

The Plant Electrician has full responsibility for the operation, maintenance, efficiency, and safety of all plant electrical circuits and electrical equipment. May supervise helpers and/or personally maintain and install wiring, motors, switch panels, fuse boxes, lighting, heating, cooling equipment. Reads and interprets blue prints and circuit diagrams; inspects all electrical equipment, connects, adjusts, and calibrates electrical gauges and recording instruments. Makes running repairs and corrections, and requisitions parts and materials in response to plant needs.

Competencies Identified and Validated

N = 27*

Competencies		Weighted Means**
1.	Personal traits and attitudes.	
a.	Electrical aptitude.	3.9
b.	Safety-oriented (concerned for safety).	3.9
c.	"Knack" for trouble shooting.	3.6
d.	Mechanical aptitude.	3.6
e.	Initiative to work independently.	3.5
f.	Cooperative with others.	3.4
g.	Plan ahead.	3.4
h.	Can be supervisory.	2.7
2.	Skill and ability of the Plant Electrician.	
a.	Wire fuse boxes.	4.0
b.	Determine correct wire capacities.	4.0
c.	Choose correct wire sizes.	3.8
d.	Wire lighting fixtures and apparatus.	3.8
e.	Wire switch panels.	3.8
f.	Read and interpret written instructions.	3.8
g.	Interpret verbal instructions.	3.8
h.	Wire motors.	3.6
i.	Install conduit.	3.6
j.	Install motors.	3.5

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* Responses from 27 Fruit and Vegetable Processing Plant Electricians throughout the United States. Survey conducted by the Agricultural Education Unit, Department of Applied Behavioral Sciences, University of California, Davis, California 95616.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

k.	Evaluate power circuit problems.	3.5
l.	Read and understand circuit diagrams.	3.5
m.	Read and understand blueprints.	3.4
n.	Repair switch panels.	3.4
o.	Install control transformers.	3.0
p.	Design wiring systems.	2.9
q.	Anticipate future materials needed.	2.9
r.	Choose correct transformers to carry needed loads.	2.9
s.	Keep maintenance records on instruments.	2.7
t.	Repair motors.	2.7
u.	Requisition materials and parts.	2.6
v.	Install high voltage transformers.	2.5
w.	Repair fans.	2.5
x.	Overhaul controls and related instruments.	2.5
y.	Maintain and repair heating systems.	2.4
z.	Maintain and repair cooling systems.	2.4
aa.	Maintain and repair packaging equipment.	2.3
bb.	Supervise crews.	2.1
cc.	Use charts and conversion tables.	2.1
dd.	Maintain and repair fire control equipment.	2.0
ee.	Repair warehouse equipment.	2.0
ff.	Repair control transformers.	1.9
gg.	Repair electrical problems of lift-trucks, clamps, and pull-pacs machinery.	1.9
hh.	Repair refrigeration unit.	1.7
ii.	Repair conveyors.	1.7
jj.	Install refrigeration units.	1.6
kk.	Repair high voltage transformers.	1.5
ll.	Repair freight elevator.	1.4
mm.	Repair ignition and electrical systems of automotive equipment.	1.4

3. Concepts and facts that the plant electrician should know.

a.	Electrical code-OSHA.	3.7
b.	English language.	3.5
c.	Basic standard electrical formulas.	3.4
d.	Electronics.	2.9
e.	Algebra.	2.1
f.	Physics.	2.0
g.	Geometry.	1.8
h.	Trigonometry.	1.8
i.	Calculus.	1.7

LIFT TRUCK OPERATOR

(Fruit and Vegetable Processing Industry)

Other Titles: Hyster Driver, Jeep Driver, Shipper, Forklift Operator, Clamp Operator, 4-hi Stacker, Car Loader, Receiver.

Job Description:

Selects stock in accordance with shipping documents and delivers them to the proper plant location. Examples of stock shipped are pallets, containers, and boxes. May load and unload highway trucks and railroad cars; stack and unstack pallets. Will maintain gas, oil, and water supply of lift trucks. Reports irregularities in operation. May be trained to use clamp, and pull-pack machinery.

Competencies Identified and Validated

N = 26*

Competencies	Weighted Means**
1. Attitudes and personal traits.	
a. Good motor coordination.	3.9
b. Good visual perception.	3.9
c. Be cautious.	3.8
d. Good spatial perception.	3.7
e. Be orderly.	3.6
f. Good hearing.	3.5
g. Be efficient.	3.3
h. Be helpful.	3.1
i. Be cooperative.	3.2
2. Skills and abilities of the Fork Lift Operator.	
a. Tilt load backwards before travelling.	3.9
b. Work safely in confined quarters.	3.7
c. Center load on forks at first approach.	3.6
d. Pick up and set down pallets.	3.6
e. Pass lift truck driving test.	3.5
f. Pick up and set down skids.	3.5
g. Pick up and set down cases.	3.5
h. Keep forks level and clear of floor.	3.5
i. Stack materials closely.	3.5
j. Drive smoothly without shaking loads.	3.4

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* Responses from 26 Fruit and Vegetable Processing Plant Lift Truck Operators throughout the United States. Survey conducted by the Agricultural Education Unit, Department of Applied Behavioral Sciences, University of California, Davis, California 95616.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

k.	Read manifest.	3.3
l.	Fill gas, change oil, and check water in lift trucks.	3.2
m.	Turn sharp corners.	3.2
n.	Drive backwards down ramps.	3.1
o.	Use inching pedal.	2.9
p.	Figure rated capacity of lift truck.	2.8
q.	Work under close supervision.	2.6
r.	Stack materials into railroad cars.	2.6
s.	Drive clamp truck.	1.7
t.	Drive pull-pack truck.	1.6
u.	Cross railroad tracks.	1.6
v.	Change batteries in electric lift trucks.	1.5
w.	Give hand signals for stopping and starting.	1.3
3.	Facts and concepts.	
a.	Aware of plant safety rules and signs.	3.8
b.	Aware of driving responsibility.	3.7
c.	Aware of plant speed limits.	3.5
d.	Have knowledge of running condition of lift truck.	3.2
e.	Aware of OSHA operating standards.	3.2
f.	Perform simple mathematical functions.	3.0
g.	Have mechanical knowledge of forklift truck.	2.1
h.	Have knowledge of electrical system.	1.7

INSTRUMENT TECHNICIAN

(Fruit and Vegetable Processing Industry)

Other Titles: Electronic Technician, Mechanic I - Instrumentation.

Job Description:

Maintains and repairs plant electronic and pneumatic instruments and meters. Overhauls processing instruments, controls, and related instruments. May test, time, and calibrate instruments for efficient performance. Keeps maintenance records, reads blue prints, charts, diagrams and operating instructions on instruments. Reads pneumatic circuit layouts and installation diagrams, makes proper use of all precision measuring instruments, and other special tools and equipment.

Competencies Identified and Validated

N = 16*

Competencies	Weighted Means**
1. Attitudes and personal traits.	
a. Precise.	3.6
b. Mechanical and electrical aptitude.	3.5
c. Reliable.	3.4
d. Prompt/punctual.	2.9
e. Fine manual dexterity.	2.3
2. Skills and abilities of the Instrument Technician.	
a. Install and repair pneumatic instruments.	3.7
b. Operate, repair and calibrate temperature controller recorders.	3.7
c. Install and repair control piping.	3.3
d. Understand theory and work with steam distribution and controls.	3.2
e. Work with transmitters.	3.1
f. Install control valves.	3.1
g. Work with receivers.	3.0
h. Understand theory and work with temperature transfer systems.	3.0
i. Utilize thermisters.	2.9
j. Utilize soft solder for installation and repairs.	2.9

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* Responses from 16 Fruit and Vegetable Processing Plant Instrument Technicians throughout the United States. Survey conducted by the Agricultural Education Unit, Department of Applied Behavioral Sciences, University of California, Davis, California 95616.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

k.	Understand theory and work with hot water systems.	2.8
l.	Understand theory and work with cold water systems.	2.8
m.	Operate hand drill.	2.7
n.	Operate oscilloscope.	2.5
o.	Repair and maintain servomotors.	2.4
p.	Operate voltmeters.	2.4
q.	Utilize silver solder for installation and repairs.	2.4
r.	Braze.	2.1
s.	Operate drill press.	2.1
t.	Operate power hack saw and grinder.	2.1
u.	Obtain license to operate Hilti power tools.	1.1
v.	Operate turret lathe.	0.9

3. Have basic knowledge of facts and concepts.

a.	English language.	3.4
b.	Electronics.	2.8
c.	Algebra.	2.1
d.	Geometry.	1.9
e.	Trigonometry.	1.8
f.	Computers.	1.2

LABORATORY TECHNICIAN

(Fruit and Vegetable Processing Industry)

Other Titles: Quality Control Club/Technician,
Process Grader, Process Checker, Food Technologist,
Microanalytical Technician.

Job Description:

Tests product during processing procedure and finished product using standardize laboratory procedures to insure that the product meets quality control standards. Evaluates and records the quality of the finished product for consistency and other factors which distinguish the product quality as acceptable for consumption.

Competencies Identified and Validated

N = 25*

Competencies	Weighted Means**
1. Attitudes and personal traits.	
a. Be able to follow instructions from supervisor.	3.9
b. Be correct, complete, and thorough in recording data.	3.9
c. Maintain an attitude of pride and concern regarding quality of work.	3.7
d. Be safety conscious and practice safe laboratory techniques.	3.6
e. Get along with and work cooperatively with fellow employees.	3.2
2. Skills and abilities.	
a. Utilize and read a thermometer.	3.6
b. Operate and read an over and under scale.	3.5
c. Use chlorine testers.	3.2
d. Know and perform sample preparation techniques.	3.2
e. Check and record net or drain weights.	3.2
f. Use pH meters to check acidity.	3.1
g. Grade for defects in product.	3.1
h. Read a refractometer to check solids.	3.0
i. Perform simple titrations to check salt and acid levels in the product.	2.9
j. Must be able to stand long period of time.	2.9

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* Responses from 25 Fruit and Vegetable Processing Plant Laboratory Technicians throughout the United States. Survey conducted by the Agricultural Education Unit, Department of Applied Behavioral Sciences, University of California, Davis, California 95616.

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k.	Make dilutions.	2.8
l.	Operate a microscope.	2.7
m.	Make and record mold counts.	2.7
n.	Make and record insect counts.	2.7
o.	Recognize visual defects in packaging.	2.7
p.	Use consistometer to measure consistency.	2.4
q.	Determine moisture content of product.	2.3
r.	Operate and read a shadowgraph scale.	2.2
s.	Use pH indicators to check acidity.	2.2
t.	Operate a steroscope to check for insect fragments, etc.	2.1
u.	Use a colorimeter.	2.0
v.	Use an analytical balance.	2.0
w.	Identify insects by fragment contamination.	1.9
x.	Operate an ultra centrifuge.	1.9
y.	Use flow tubes to check viscosity.	1.8
z.	Utilize hydrometer to check specific gravities.	1.7
aa.	Use a micrometer to measure can seams.	1.5
bb.	Know tear-down techniques.	1.3
cc.	Use dial calipers to measure can seams.	1.2
dd.	Use a seam scope and projector.	1.0
ee.	Operate tenderometer.	1.0

3. Facts and concepts.

a.	Read and write English.	3.9
b.	Make subjective evaluations of character, flavor, texture, color, and odor of finished product.	3.4
c.	Record data on charts and understand results or implications.	3.4
d.	Have a knowledge of basic mathematics including negative numbers.	3.2
e.	Understand terminology (i.e., "smoothness," "contour," etc.)	2.5
f.	Have a basic knowledge of chemistry.	2.4
g.	Have a basic knowledge of biology.	1.8

PLANT MAINTENANCE MECHANIC

(Fruit and Vegetable Processing Industry)

Other Titles: General Mechanic, Maintenance Journeyman, Department Mechanic, Plant Engineer.

Job Description:

Installs, assembles, maintains, and overhauls plant machinery and equipment. Reads sketches, prints, and operating instructions and determines procedures. Checks materials and parts and makes requisitions. Tests, times and adjusts machinery and equipment. Operates various hand tools and equipment including welding equipment. May direct mechanical and maintenance crews.

Competencies Identified and Validated

N = 29*

Competencies	Weighted Means**
1. Attitudes and personal traits.	
a. Be safety conscious and practice safe mechanical procedures.	3.8
b. Must be mechanically inclined.	3.7
c. Must be careful and conscientious.	3.7
d. Be able to communicate with co-workers.	3.6
e. Must be physically capable of performing light to hard manual labor.	3.5
f. Be able to correctly diagnose mechanical failures or troubleshoot.	3.4
g. Be able to work in high tension and stressful situations.	3.3
h. Be able to organize and direct helpers.	3.0
2. Skills and abilities.	
a. Change bearings.	3.6
b. Change sprockets.	3.6
c. Tighten belts.	3.6
d. Perform emergency repairs.	3.6
e. Be able to operate a drill press.	3.6
f. Be able to operate a cutting torch.	3.5
g. Install pulleys.	3.5
h. Lace belts.	3.5
i. Repair link chains.	3.5

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* Responses from 29 Fruit and Vegetable Processing Plant Maintenance Mechanics throughout the United States. Survey conducted by the Agricultural Education Unit, Department of Applied Behavioral Sciences, University of California, Davis, California 95616.

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j.	Install safety guards and braces.	3.5
k.	Tear down and reassemble machinery and equipment.	3.5
l.	Be able to operate an electric arc welder.	3.4
m.	Be able to operate an oxy-acetylene welder.	3.4
n.	Be able to operate a brazing torch.	3.4
o.	Fabricate materials for mounts.	3.4
p.	Pack bearings.	3.4
q.	Test and time machinery.	3.4
r.	Be able to operate a stainless steel welder.	3.1
s.	Be able to operate a micrometer.	3.0
t.	Read gauges on micrometers and other precision tools.	3.0
u.	Maintain and repair hydraulic systems.	3.0
v.	Maintain and repair phneumatic systems.	3.0
w.	Be able to operate a heliarch welder.	2.9
x.	Maintain and repair centrifugal and positive displacement pumps.	2.9
y.	Can do sheet metal work.	2.7
z.	Be able to operate a surface grinder.	2.6
aa.	Be responsible for plumbing, maintenance and repair.	2.5
bb.	Keep accurate records.	2.2
cc.	Make parts requisitions.	2.2
dd.	Be able to operate a jack hammer.	2.0
ee.	Keep accurate time cards.	2.0
ff.	Be able to operate a milling machine.	1.9
gg.	Be responsible for painting procedures.	1.8
hh.	Perform necessary carpentry functions.	1.8
ii.	Keep accurate inventories.	1.8
jj.	Perform electrical maintenance and repair procedures.	1.7
kk.	Perform concrete work.	1.7
ll.	Be able to operate a shaper.	1.6
mm.	Be able to operate a turret lathe.	1.5
nn.	Make automotive repairs.	1.5
oo.	Keep accurate cost sheets.	1.2

3. Concepts and Facts.

a.	Be able to read and write English.	3.6
b.	Have knowledge of OSHA standards.	3.1
c.	Have basic understanding of mathematics.	3.1
d.	Know where to obtain current OSHA standards.	2.9
e.	Have knowledge of current FDA standards.	2.7
f.	Understand operating principles of centrifugal and positive displacement pumps.	2.7
g.	Have a basic understanding of the principles of engine operation.	2.4
h.	Have knowledge of metal stresses and fatigues.	2.3
i.	Have an understanding of temperatures and indicators of temperature (i.e., color of heating metal, thermometers).	2.2
j.	Have a basic understanding of electrolysis.	1.7

SLAUGHTER HOUSE WORKER

Job Description:

Slaughter House Workers work in a slaughtering plant, whether large or small, and are involved in the slaughter and dressing of beef, sheep, or swine. They may be employed in a small slaughter house where they are doing most or all of the steps in slaughtering or in a large plant where they are only doing one or a few. Workers are involved with the slaughter animals from the time they are humanely slaughtered, bled, skinned, and cooled.

Competencies Identified and Validated

N = 37*

	Competencies	Weighted Mean**
1.	Slaughter beef animals.	3.2
a.	Stick or bleed cattle.	3.7
b.	Remove fore feet.	3.7
c.	Open hide down midline.	3.7
d.	Remove hide from brisket.	3.7
e.	Remove hide from the sides of the rounds.	3.7
f.	Skin hide around rump.	3.7
g.	Trim carcass - hide, skin, bruises, warbles, dirt, manure.	3.7
h.	Stun or immobilize cattle.	3.3
i.	Skin head.	3.3
j.	Remove hide from short plate.	3.3
k.	Remove hide from flank.	3.3
l.	Skin hides from side.	3.3
m.	Open hide to the bung.	3.3
n.	Loosen and drop the bung.	3.3
o.	Skin hide around sirloin.	3.3
p.	Drop hide from sirloin.	3.3
q.	Drop hide over the back.	3.3
r.	Drop hide down to the neck.	3.3
s.	Open abdominal cavity.	3.3
t.	Remove paunch, intestines, liver, spleen, and stomachs.	3.3
u.	Cut diaphragm.	3.3
v.	Remove pluck.	3.3
w.	Split carcass into two halves.	3.3
x.	Remove bone dust in sternum and vertebrae.	3.3
y.	Weigh the carcass.	3.3

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z.	Tag the carcass.	3.3
aa.	Place carcass in holding cooler.	3.3
bb.	Shackle cattle.	3.0
cc.	Remove head.	3.0
dd.	Skin fore feet.	3.0
ee.	Skin hind feet.	3.0
ff.	Remove hind feet.	3.0
gg.	Pin the neck with skewer.	3.0
hh.	Scribe feather bones.	3.0
ii.	Break feather bones.	3.0
jj.	Wash carcass with warm water.	3.0
kk.	Place carcass in cooler (hot box).	3.0
ll.	Remove shroud.	3.0
mm.	Rib carcass.	3.0
nn.	Shroud the carcass.	2.7
oo.	Pin the shroud.	2.7
pp.	Remove the oxtail.	2.3
2.	Slaughter lambs.	3.1
a.	Stun or immobilize lamb.	3.7
b.	Remove paunch, intestines, liver, spleen, and stomachs.	3.7
c.	Stick or bleed lamb.	3.3
d.	Skin the hind legs.	3.3
e.	Skin the fore legs.	3.3
f.	Skin the neck.	3.3
g.	Skin the breast.	3.3
h.	Tie off the esophagus.	3.3
i.	Fist the pelt from the abdomen and flanks.	3.3
j.	Fist the pelt from rump, legs, cod or udder.	3.3
k.	Cut around anus to clear dock.	3.3
l.	Pull pelt over loin, rack, shoulder and neck.	3.3
m.	Trim around neck.	3.3
n.	Remove pelt.	3.3
o.	Remove head.	3.3
p.	Open abdominal cavity.	3.3
q.	Wash carcass.	3.3
r.	Weigh carcass.	3.3
s.	Shackle lamb.	3.0
t.	Open the pelt from navel to anus.	3.0
u.	Cut diaphragm.	3.0
v.	Remove pluck.	3.0
w.	Trim carcass - skin, wool, bruises, hair, manure.	3.0
x.	Tag the carcass.	3.0
y.	Place carcass in cooler.	3.0
z.	Place carcass in holding cooler.	3.0
aa.	Tie hind shanks together.	2.3
bb.	Tie foreshanks.	2.3
3.	Slaughter swine.	3.1
a.	Stun or immobilize hog.	3.7

b.	Shackle hog.	3.3
c.	Stick or bleed hog.	3.3
d.	Put hog in scalding vat.	3.3
e.	Remove hog from scalding vat.	3.3
f.	Open abdominal cavity.	3.3
g.	Remove viscera.	3.3
h.	Split the hams.	3.3
i.	Split the hog in two with cleaver or saw.	3.3
j.	Wash the carcass.	3.3
k.	Put hog in dehairer or remove hair with bell scraper.	3.0
l.	Use hands and fingers to remove hair from face, jowls and legs.	3.0
m.	Use knife to remove remaining skin, hair, and scurf.	3.0
n.	Remove toenails.	3.0
o.	Remove dew claws.	3.0
p.	Expose gambrel tendens.	3.0
q.	Insert gambrel.	3.0
r.	Suspend on rail.	3.0
s.	Singe hog.	3.0
t.	Shave remaining hair.	3.0
4.	Observe safety precautions.	3.4
a.	Apply first aid to minor cuts, bruises, and burns.	4.0
b.	Follow safe work habits.	3.7
c.	Identify potential safety hazards.	3.3
d.	Wear appropriate protective clothing.	3.3
e.	Use proper lifting and carrying methods.	3.3
f.	Wear appropriate work clothing.	3.3
g.	Adjust safety shields and devices.	3.3
h.	Remove debris from work areas.	3.3
i.	Correct potential safety hazards.	3.0
5.	Use and maintain hand and power equipment.	3.2
a.	Adjust tools and equipment.	3.7
b.	Clean tools.	3.7
c.	Select appropriate tools and equipment for specific jobs.	3.3
d.	Sharpen tools.	3.3
e.	Use hand tools safely.	3.3
f.	Use power tools and equipment safely.	3.3
g.	Use electric and hand saws.	3.3
h.	Identify tools.	3.0
i.	Interpret tool and equipment operation instructions.	3.0
j.	Store tools.	3.0
k.	Use fly fans.	3.0
l.	Use knives and cleavers.	3.0
m.	Use meat hooks.	3.0
n.	Use meat tracks and hooks.	3.0

	o.	Use metal and wooden skewers.	3.0
6.		Sanitize meat slaughter facilities.	3.5
	a.	Evaluate influence sanitary conditions may have on meat spoilage.	4.0
	b.	Clean and sanitize floors, ceilings, and walls in the slaughter room and cooler.	3.7
	c.	Clean and sanitize meat slaughter tools.	3.7
	d.	Clean and sanitize power cutting equipment.	3.7
	e.	Select appropriate cleaning and sanitizing agents and equipment.	3.3
	f.	Identify personal sanitation practices to follow.	3.0
	g.	Identify sanitation requirements for licensing.	3.0

PROCESSED MEATS WORKER

Job Description:

The Processed Meats Worker is involved with the process of preservation of meats. He may be involved in any one of the following types of processing: dry curing, curing with liquid, injection curing, cover pickle curing, combination cures, smoke curing, and sausage preparation.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Bacon.	2.4
a.	Trim bacon.	3.3
b.	Clean knives and tools.	3.2
c.	Clean up machines.	3.2
d.	Clean working area.	3.0
e.	Set schedule on smoke house.	2.7
f.	Put bacon in smoke house.	2.6
g.	Arrange bacon prior to packaging machine.	2.6
h.	Remove combs from bacon.	2.5
i.	Take internal temperature.	2.5
j.	Pump bacon with cure or feed.	2.5
k.	Weigh bacon.	2.5
l.	Separate bacon (grades bacon).	2.3
m.	Feed bacon slicer.	2.3
n.	Unload smoke house.	2.3
o.	Pump machine, insert combs into bacon.	2.3
p.	Put bacon in cooler.	2.3
q.	Hang bacon on racks.	2.0
r.	Box packaged bacon.	1.7
s.	Remove from blast chiller.	1.7
t.	Transfer bacon to blast chiller.	1.7
u.	Operate bacon presser (squares them).	1.3
2.	Hams.	2.3
a.	Trim hams.	3.3
b.	Clean up machines.	3.2
c.	Clean up knives and tools.	3.0
d.	Take internal temperature.	3.0
e.	Pump hams with cure or feed pumping machine.	2.8
f.	Clean up working area.	2.8

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g.	Check ham for proper injection.	2.7
h.	Weigh hams.	2.5
i.	Set schedule on smoke house.	2.5
j.	Bone hams (remove all bones).	2.5
k.	Hang hams on racks.	2.3
l.	Put hams in smoke house.	2.3
m.	Unload smoke house.	2.3
n.	Tie ham in stockinette.	2.0
o.	Shape ham.	1.8
p.	Remove stockinette.	1.8
q.	Box hams.	1.7
r.	Tie bag.	1.7
s.	Remove casing.	1.7
t.	Trim internal fat.	1.7
u.	Stuff ham into casing.	1.5
v.	Stuff into cryovac.	1.3
3.	Sausage.	2.9
a.	Grind beef.	3.5
b.	Grind pork.	3.5
c.	Add salt, dextrose and seasoning.	2.8
d.	Clean grinder.	2.8
e.	Clean chopper.	2.8
f.	Add remaining moisture.	2.7
g.	Add pork trim.	2.6
h.	Package sausage.	2.5
i.	Place in cutter or chopper.	2.5
j.	Keep track of products temperature throughout the chopping period.	2.5
k.	Transfer the product to the stuffer.	2.5
l.	Set schedule on smoke house.	2.5
m.	Hang sausage.	2.3
n.	Place in smoke house.	2.3
o.	Remove from smoke house.	2.3
p.	Put into cooler.	2.3
q.	Shut down smoke house and apply steam.	2.0
r.	Shut off steam and apply cold water shower.	2.0
s.	Add 1/2 moisture (ice or cold water).	1.8
t.	Box sausage.	1.5
u.	Peel sausage.	1.3

BREAKING HOUSE WORKER

Job Description:

The Breaking House Worker works in a plant where beef carcasses are cut into the primal cuts; chucks, ribs, loins and rounds. Veal carcasses are cut into the standard primal cuts; leg, loin, hotel rack, shoulder. Lamb carcasses are cut into the standard primal cut; leg, loin, hotel rack, and shoulder. And pork carcasses are cut into the standard primal cuts; fresh hams, loins, Boston butts, and pork shoulders. The worker may be involved with many steps in breaking carcasses or they may be in a larger plant where they are involved with only a few steps. These primal cuts are shipped to the retail stores to be cut up into retail cuts.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Observe safety precautions.	3.1
a.	Wear appropriate work clothing.	3.4
b.	Follow safe work habits.	3.4
c.	Use proper lifting and carrying methods.	3.3
d.	Wear appropriate protective clothing.	3.3
e.	Correct potential safety hazards.	3.1
f.	Interpret information on labels and signs.	3.1
g.	Identify potential safety hazards.	3.1
h.	Adjust safety shields and devices.	3.0
i.	Apply first aid to minor cuts, bruises, and burns.	3.0
j.	Remove debris from work areas.	2.7
k.	Install safety devices.	2.4
2.	Use and maintain hand and power meat cutting tools and equipment.	3.1
a.	Use power tools and equipment safely.	3.6
b.	Use hand tools safely.	3.4
c.	Use electric and hand saws.	3.4
d.	Use knives and cleavers.	3.4
e.	Interpret tool and equipment operation instructions.	3.4
f.	Adjust tools and equipment.	3.3
g.	Identify tools.	3.3
h.	Select appropriate tools and equipment for specific jobs.	3.3

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i.	Sharpen tools.	3.3
j.	Clean tools.	3.1
k.	Recondition tools.	3.1
l.	Set-up tools and equipment.	3.0
m.	Use meat hooks.	3.0
n.	Use cutting tables and blocks.	2.9
o.	Use meat tracks and hooks.	2.9
p.	Store tools.	2.7
q.	Use scales.	2.7
r.	Use block brush and scraper.	1.9
3.	Breaking beef.	3.8
a.	Cut ribs.	3.9
b.	Cut short loin.	3.9
c.	Cut sirloin.	3.9
d.	Pull tenderloin.	3.9
e.	Cut chuck.	3.7
f.	Cut brisket.	3.7
g.	Cut plate.	3.7
h.	Cut flank.	3.7
i.	Cut round.	3.7
j.	Identify primal cuts.	3.7
k.	Trim cuts of beef.	3.7
l.	Cut fore and hind shanks.	3.6
4.	Breaking veal.	3.2
a.	Cut hotel rack.	3.3
b.	Cut loin.	3.3
c.	Cut legs.	3.3
d.	Cut shoulder.	3.1
e.	Cut breast.	3.1
f.	Identify the primal cuts of veal.	3.1
g.	Trim veal meat cuts.	3.1
h.	Cut fore and hind shanks.	3.0
5.	Breaking lamb.	3.1
a.	Cut loin.	3.3
b.	Cut leg.	3.3
c.	Identify the primal cuts of lamb.	3.1
d.	Trim lamb cuts.	3.1
e.	Cut hotel rack.	3.0
f.	Cut breast.	3.0
g.	Cut square cut shoulder.	2.9
6.	Breaking pork.	2.5
a.	Cut pork loin.	2.7
b.	Cut fresh hams.	2.7
c.	Identify the primal cuts of pork.	2.7
d.	Cut pork shoulder (picnic shoulder).	2.6
e.	Cut bacon (side pork).	2.4
f.	Cut Boston butt (shoulder).	2.3

	g.	Cut fat back.	2.1
	h.	Cut jowl.	2.1
7.		Refrigerate and store meats.	3.5
	a.	Rotate meats on a first-in first-out basis.	4.0
	b.	Recognize signs of meat spoilage.	3.9
	c.	Control temperature in storage areas.	3.3
	d.	Determine temperature for meat storage areas.	3.3
	e.	Handle carcasses in the cooler.	3.1
8.		Sanitize meat cutting facilities.	2.6
	a.	Identify personal sanitation practices to follow.	3.3
	b.	Clean and sanitize meat cutting tools.	3.1
	c.	Clean and sanitize power meat cutting equipment.	2.6
	d.	Evaluate influence sanitary conditions may have on meat spoilage.	2.6
	e.	Clean and sanitize floors, ceilings, and walls in the cutting room and cooler.	2.4
	f.	Clean and sanitize racks and counters in the cutting room and cooler.	2.4
	g.	Select appropriate cleaning and sanitizing agents and equipment.	2.4
	h.	Identify sanitation requirements for licensing.	2.3

RETAIL MEAT CUTTER

Other Titles: Head Meat Cutter, Meat Buyer-Cutter, Meat Department Manager.

Job Description:

The Retail Meat Cutter may work in retail meat outlets such as butcher shops and meat departments in retail stores. The meat cutter works with records kept in the meat department, cutting meat, and displaying cuts of meat for sale. The specific duties performed by the meat cutter will vary with the size and type of business where employed. In general, the meat cutter helps maintain inventories of meat on hand; maintains sanitary working areas; cuts beef, pork, veal, lamb, and poultry into retail cuts; prepares ground and ready to serve meats; packages and displays meats; and assists in the purchasing and managing of the retail meat department.

Competencies Identified and Validated

N = 37*

Competencies			Weighted Mean**
1.	Perform general office procedures.		2.1
	a.	File various items of information.	2.2
	b.	Meet people.	2.0
	c.	Use telephone.	2.0
	d.	Write memos, letters, and notes.	2.0
2.	Record information.		3.0
	a.	Record inventory information on sheets.	3.4
	b.	Record customer order information.	3.2
	c.	Record amount of meat and poultry processed during day.	2.4
3.	Inventory meats and supplies.		2.7
	a.	Remove damaged meat and poultry from inventory.	2.8
	b.	Take a physical inventory.	2.6
	c.	Determine amount of meat and poultry inventory on hand from records.	2.6
4.	Follow legal regulations.		2.9
	a.	Display appropriate inspection certificates.	3.0
	b.	Interpret local, state, and federal inspection requirements.	3.0

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	c.	Interpret meat marketing regulations.	2.6
5.		Observe safety precautions.	2.8
	a.	Follow safe work habits.	3.2
	b.	Remove debris from work areas.	3.2
	c.	Wear appropriate protective clothing.	3.0
	d.	Interpret information on labels and signs.	3.0
	e.	Correct potential safety hazards.	3.0
	f.	Use electrical connectors and safety devices.	3.0
	g.	Identify potential safety hazards.	2.8
	h.	Store chemicals.	2.8
	i.	Adjust safety shields and devices.	2.8
	j.	Apply first aid to minor cuts, bruises and burns.	2.6
	k.	Ventilate work area.	2.6
	l.	Wear appropriate work clothing.	2.6
	m.	Use proper lifting and carrying methods.	2.4
	n.	Install safety devices.	2.4
6.		Sell and display meats.	3.0
	a.	Describe various meat items to customers.	3.6
	b.	Label meats in display cases.	3.6
	c.	Rotate meats in display cases.	3.6
	d.	Price various meats for customers.	3.4
	e.	Greet customers.	3.2
	f.	Receive customer orders by telephone.	3.2
	g.	Stock self-service meat displays.	3.2
	h.	Arrange meat displays.	3.2
	i.	Weigh meats in display cases.	3.2
	j.	Set up a self-service meat display.	3.0
	k.	Make change for customers.	3.0
	l.	Handle customer complaints.	3.0
	m.	Determine percent markup and profits.	3.0
	n.	Regulate lighting in display cases.	2.8
	o.	Interpret customer's orders for various cuts.	2.6
	p.	Prepare advertisements.	2.4
	q.	Post sales announcements in display cases.	2.4
	r.	Operate cash register.	2.2
	s.	Identify seasonal items.	2.2
7.		Receive meat shipments.	2.9
	a.	Check material received against order.	3.6
	b.	Notate descrepancies on invoices.	3.6
	c.	Sign shipping receipt.	3.4
	d.	Inspect merchandise for damage.	3.2
	e.	Use spec-stick or receiving control device.	2.0
	f.	Help unload shipments.	1.6
8.		Use and maintain hand and power meat cutting tools and equipment.	2.8
	a.	Use scales.	3.8
	b.	Use hand tools safely.	3.6

c.	Use cutting tables and blocks.	3.6
d.	Use knives and cleavers.	3.6
e.	Interpret tool and equipment operation instructions.	3.4
f.	Select appropriate tools and equipment for specific jobs.	3.4
g.	Sharpen tools.	3.4
h.	Use power tools and equipment safely.	3.4
i.	Use grinder.	3.4
j.	Clean tools.	3.2
k.	Store tools.	3.2
l.	Use meat tracks and hooks.	3.2
m.	Adjust tools and equipment.	3.0
n.	Identify tools.	3.0
o.	Use electric and hand saws.	3.0
p.	Use meat hooks.	3.0
q.	Set-up tools and equipment.	2.8
r.	Use cuber.	2.8
s.	Use fly fans.	2.8
t.	Use rib trees.	2.6
u.	Use slicers.	2.6
v.	Recondition tools.	2.2
w.	Use tenderizer.	2.2
x.	Use patty maker.	2.0
y.	Use automatic wrapping and tying machines.	1.8
z.	Use metal and wooden skewers.	1.8
aa.	Use rolling storage and aging shelves.	1.8
bb.	Use block brush and scraper.	1.6
cc.	Use automatic labeling machines.	1.4
dd.	Use larding needle.	1.4
9.	Package meats.	2.6
a.	Select appropriate wrapping materials.	3.4
b.	Weigh meats for packaging.	2.8
c.	Wrap meats for customers' home freezers.	2.8
d.	Label packages for use in self-service display cases.	2.6
e.	Wrap and re-wrap packages for self-service display cases.	2.6
f.	Estimate weight of bulk meats.	2.2
g.	Inspect self-service display cases to determine which packages need to be rewrapped.	2.0
10.	Purchase meat, poultry, and supplies.	3.1
a.	Determine the amount to order.	3.2
b.	Determine what to order.	3.2
c.	Determine when to order.	3.2
d.	Evaluate the quality of meat and poultry from various suppliers.	3.2
e.	Compare and verify costs of meat and poultry from various suppliers.	3.0

	f.	Determine the quantity of meat and poultry to keep on hand.	3.0
	g.	Identify various sources of meat and poultry suppliers.	3.0
	h.	Identify various sources of meat processing supplies.	2.8
11.	Cut beef.		3.2
	a.	Identify primal beef cuts.	4.0
	b.	Bone beef.	3.8
	c.	Break beef forequarter and hindquarter.	3.8
	d.	Identify retail beef cuts.	3.8
	e.	Identify wholesale beef cuts.	3.8
	f.	Pull tenderloin (fillet).	3.4
	g.	Trim cuts of beef.	3.4
	h.	Cut chuck.	3.2
	i.	Cut foreshank.	3.2
	j.	Cut rib.	3.2
	k.	Cut round.	3.2
	l.	Cut short loin.	3.2
	m.	Cut short plate.	3.2
	n.	Strip the loin.	3.2
	o.	Cut brisket.	3.0
	p.	Cut flank.	3.0
	q.	Cut tips.	3.0
	r.	Handle beef in cutting room.	3.0
	s.	Shape roasts with string.	3.0
	t.	Cube beef by machine.	2.8
	u.	Cut and prepare beef heart.	2.8
	v.	Cut and prepare beef liver.	2.8
	w.	Cut and prepare beef tongue.	2.8
	x.	Prepare beef brains.	2.8
12.	Cut pork.		3.2
	a.	Identify retail pork cuts.	3.8
	b.	Identify the primal cuts of pork.	3.8
	c.	Identify wholesale pork cuts.	3.8
	d.	Bone pork.	3.6
	e.	Cut spareribs.	3.6
	f.	Handle pork in the cutting room.	3.6
	g.	Cut bacon (side pork).	3.4
	h.	Cut loin.	3.2
	i.	Cut picnic shoulder.	3.2
	j.	Cut smoked or fresh leg.	3.2
	k.	Shape roasts with string.	3.0
	l.	Cut Boston shoulder.	2.8
	m.	Cut fat back.	2.8
	n.	Slice ham.	2.8
	o.	Cut clean plate.	2.6
	p.	Cut jowl.	2.6

13.	Cut lamb.	3.2
a.	Identify retail cuts of lamb.	3.8
b.	Identify the primal cuts of lamb.	3.8
c.	Identify wholesale cuts of lamb.	3.8
d.	Cut loin.	3.6
e.	Break the hindsaddle and foresaddle.	3.4
f.	Handle lamb in the cutting room.	3.4
g.	Trim lamb cuts.	3.4
h.	Bone lamb.	3.2
i.	Cut leg.	3.2
j.	Cut neck.	3.2
k.	Cut sirloin.	3.2
l.	Cut breast.	3.0
m.	Cut hindshank and foreshank.	3.0
n.	Cut rib.	2.8
o.	Cut shoulder.	2.8
p.	Cut ground or cubed lamb.	2.6
q.	Score loin.	2.6
14.	Cut veal.	3.4
a.	Bone veal.	3.8
b.	Break down veal forequarter or foresaddle and hindquarter.	3.8
c.	Identify the primal cuts of veal.	3.8
d.	Identify wholesale cuts of veal.	3.8
e.	Cut loin.	3.6
f.	Cut rib.	3.6
g.	Cut round.	3.6
h.	Identify retail cuts of veal.	3.6
i.	Trim veal meat cuts.	3.6
j.	Cut shoulder.	3.4
k.	Cut sirloin.	3.4
l.	Handle veal in the cutting room.	3.2
m.	Cut breast.	3.0
n.	Cut hind and fore shanks.	3.0
o.	Grind veal.	3.0
p.	Cut veal by machine.	2.8
15.	Prepare ground and ready-to-serve meats.	3.5
a.	Grind meats.	3.8
b.	Identify pork meats to be used for ground ham loaf.	3.6
c.	Select beef meats to be used for ground beef.	3.4
d.	Select pork meats to be used for sausages.	3.4
e.	Select veal meats to be used for ground veal.	3.4
f.	Select lamb meats to be used for ground lamb.	3.2
16.	Inspect and grade meat.	2.9
a.	Evaluate influence grade has on preparation procedures for customers.	3.2
b.	Evaluate the influence grade has on retail price.	3.2

c.	Display inspection certificates.	3.0
d.	Evaluate the various characteristics which determine grade.	3.0
e.	Evaluate why meats are graded.	3.0
f.	Evaluate why wholesale and retail meat firms are inspected.	2.8
g.	Identify various meat inspection agencies.	2.4
h.	Interpret grading stamps on wholesale cuts.	2.4
17.	Refrigerate and store meats.	2.9
a.	Recognize signs of meat spoilage.	3.8
b.	Control temperature in storage areas.	3.6
c.	Determine temperature for meat storage areas.	3.6
d.	Rotate meats on a first-in first-out basis.	3.6
e.	Determine freezer storage life of various meats.	3.4
f.	Read thermometers in storage areas.	3.2
g.	Handle carcasses in the cooler.	3.0
h.	Handle retail meat in the cooler.	3.0
i.	Quick freeze meats for customers.	3.0
j.	Evaluate influence temperature, humidity, and air circulation have on longevity of meat.	2.8
18.	Cure meats.	3.0
a.	Apply spices to meats.	3.6
b.	Identify appropriate meat cuts that may be cured.	3.4
c.	Dry meats.	2.4
d.	Smoke meats.	2.4
19.	Sanitize meat cutting facilities.	3.4
a.	Clean and sanitize display cases.	3.8
b.	Clean and sanitize meat cutting tools.	3.8
c.	Clean and sanitize power meat cutting equipment.	3.8
d.	Clean and sanitize floors, ceilings, and walls in the cutting room and cooler.	3.4
e.	Clean and sanitize racks and counters in the cutting room and cooler.	3.4
f.	Evaluate influence sanitary conditions may have on meat spoilage.	3.4
g.	Identify personal sanitation practices to follow.	3.2
h.	Select appropriate cleaning and sanitizing agents and equipment.	3.0
i.	Identify sanitation requirements for licensing.	2.8

MEAT INSPECTOR

Job Description: Meat Inspectors assist in antemortem and postmortem inspections and look for abnormal and unusual conditions. They report to veterinary meat inspectors who are graduates of veterinary colleges which are accredited by the Civil Service Commission. They are designed to protect the consumer, give official assurance of wholesomeness and proper labeling, and detect and locate communicable diseases. Their basic functions are detection and destruction of diseased meat; assurance of clean and sanitary handling and preparation; prevention of adulteration (the addition of harmful substances or products considered improper in certain specified quantities); prevention of false labeling; application of the inspection stamp.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Facilities and processing sanitation standards.	3.2
a.	Inspect rodent and insect control.	3.8
b.	Inspect general housekeeping - production area.	3.7
c.	Inspect equipment - product zone.	3.7
d.	Inspect walls.	3.5
e.	Inspect freezers and coolers.	3.5
f.	Inspect employee - dress.	3.5
g.	Inspect employee - hygiene.	3.5
h.	Inspect employee - work habits.	3.5
i.	Inspect handwashing and sanitizing.	3.5
j.	Inspect hot water supply.	3.5
k.	Inspect water pressure for clean-up purposes.	3.5
l.	Inspect windows, screens, etc.	3.3
m.	Inspect ceilings and overhead structures.	3.3
n.	Inspect doors.	3.3
o.	Inspect rails and shackles.	3.3
p.	Inspect sewer drainage system.	3.3
q.	Inspect outside premises.	3.3
r.	Inspect dry storage areas.	3.2
s.	Inspect production practices.	3.2
t.	Inspect floors.	3.2
u.	Inspect equipment - non-product zone.	2.8

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* Responses from 37 Slaughterhouses and Retail Meat Cutters in 16 states. Survey conducted by the Agricultural Education Department, California Polytechnic State University, San Luis Obispo, California 93407.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

v.	Inspect ice facilities.	2.8
w.	Inspect general housekeeping - nonproduction area.	2.8
x.	Inspect water supply.	2.8
y.	Inspect lights.	2.5
z.	Inspect welfare facilities.	2.5
aa.	Inspect lighting.	2.5
bb.	Inspect ventilation.	2.3
cc.	Inspect antemortem areas.	2.3
2.	Antemortem inspection.	3.3
a.	Condemn animals with symptoms of a communicable disease.	4.0
b.	Condemn animals unfit for food.	3.8
c.	Tag unfit animals with a "condemned" tag.	3.8
d.	Assure elimination of unfit animals for food purposes.	3.8
e.	Inspect animals after arrival to plant.	3.6
f.	Condemn dead or dying animals.	3.2
g.	Eliminate animals with eminent parturition.	3.2
h.	Oversee final disposition of a "suspected" animal after postmortem examination is made.	3.2
i.	Tag doubtful animals as "suspect".	3.0
j.	See that "suspect" animals are separated and slaughtered separately.	3.0
k.	Condemn animals with abnormal temperature.	2.8
l.	Condemn comatose animals.	2.4
3.	Postmortem inspection of cattle.	2.9
a.	Incise repeatedly and examine the mandibular, suprapharnngeal, and parotid lymph nodes.	3.2
b.	Incise and examine the external and internal masseter muscles.	3.2
c.	Inspect head before corresponding carcass has been eviscerated.	3.2
d.	Incise repeatedly and examine the anterior and posterior mediastinal and bronchial lymph nodes.	3.2
e.	Palpate and examine tongue.	3.0
f.	Palpate the lungs.	2.8
g.	Examine the external and internal surfaces of the heart.	2.8
h.	Incise repeatedly and examine the hapatic lymph nodes.	2.8
i.	Open and examine bile duct.	2.8
j.	Palpate the liver.	2.8
k.	Examine paunch.	2.8
l.	Examine intestines.	2.8
m.	Examine mesenteric lymph glands.	2.8
n.	Examine spleen.	2.8
o.	Examine exposed surfaces of the carcass.	2.8
p.	Examine linings of thoracic, abdominal, and pelvic cavities.	2.8

	q.	Palpate the kidneys.	2.2
4.		Postmortem inspection of sheep.	2.2
	a.	Examine and palpate the external surface of the heart.	2.2
	b.	Palpate the mediastinal and bronchial lymph nodes.	2.2
	c.	Palpate the lungs.	2.2
	d.	Examine and palpate the liver.	2.2
	e.	Open the bile duct transversely.	2.2
	f.	Examine the spleen.	2.2
	g.	Examine the paunch.	2.2
	h.	Examine the intestines.	2.2
	i.	Examine the exposed surfaces of the carcass.	2.2
	j.	Examine the linings of the thoracic, abdominal and pelvic cavity.	2.2
	k.	Palpate the kidneys.	2.2
5.		Postmortem inspection of hogs.	2.8
	a.	Incise repeatedly and examine the two mandibular lymph nodes.	2.8
	b.	Palpate the bronchial lymph nodes.	2.8
	c.	Palpate the lungs.	2.8
	d.	Examine and palpate the external surface to the heart.	2.8
	e.	Examine the liver.	2.8
	f.	Palpate the hepatic lymph nodes.	2.8
	g.	Examine the spleen.	2.8
	h.	Examine the stomach.	2.8
	i.	Examine the intestines.	2.8
	j.	Palpate the mesenteric lymph nodes.	2.8
	k.	Examine the exposed surfaces of the split carcass.	2.8
	l.	Examine the exposed surfaces of the joints.	2.8
	m.	Examine the exposed surfaces of the lining of the thoracic, abdominal and pelvic cavities.	2.8
	n.	Palpate the kidneys.	2.8
6.		Product inspection.	3.0
	a.	Fill out daily sanitation report.	3.3
	b.	Check for the use of harmful substances in the formulation of a product.	3.2
	c.	Check for proper labeling.	3.0
	d.	Check for proper net weights on products.	3.0
	e.	Take samples of all spices, condiments, coloring agents, cereals, and other additives.	2.8
	f.	Send samples to Federal lab for compliances.	2.8
	g.	Check for deviations in formulas used in processing products.	2.8
	h.	Check for proper processing techniques.	2.8

FISH CANNERY WORKER

Job Description:

The Fish Cannery Worker works in a fish cannery, whether large or small, and is involved in the cleaning, cooking, boning, and canning of fish. He or she may be employed in a small cannery doing several jobs or in a large cannery doing one or only a few jobs.

Competencies Identified and Validated

N = 31*

Competencies		Weighted Mean**
1.	Perform fish room skills and competencies.	2.4
a.	Gut fish.	3.3
b.	Examine raw fish (smeller).	3.2
c.	Cut tuna.	2.9
d.	Remove bones.	2.9
e.	Remove skin.	2.9
f.	Operate shaping and cutting machine.	2.5
g.	Separate dark meat.	2.4
h.	Remove loins (white meat).	2.4
i.	Operate labeling machine.	2.4
j.	Cut sardines.	2.3
k.	Cut mackerel.	2.3
l.	Rack fish.	2.3
m.	Operate sealing machine.	2.3
n.	Unload cooker.	2.2
o.	Load cooler room.	2.2
p.	Load cooker.	2.1
q.	Load cooler.	2.1
r.	Operate canning machine.	2.0
s.	Load cleaning tables.	1.6
2.	Perform miscellaneous jobs.	2.1
a.	Scale operator.	2.6
b.	Inspect for quality control.	2.1
c.	Maintain machinery (mechanic).	2.1
d.	Operate jitney (forklift).	1.9
e.	Operate dock hoist.	1.9
3.	Observe safety precautions.	2.9
a.	Follow safe work habits.	3.1

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* Responses from 31 Fish Canneries and Retail Fish Markets in 12 states. Survey conducted by the Agricultural Education Department, California Polytechnic State University, San Luis Obispo, California 93407.

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	b.	Wear appropriate protective clothing.	3.0
	c.	Use proper lifting and carrying methods.	3.0
	d.	Wear appropriate work clothing.	3.0
	e.	Identify potential safety hazards.	2.8
	f.	Correct potential safety hazards.	2.8
	g.	Remove debris from work areas.	2.8
	h.	Apply first aid to minor cuts, bruises and burns.	2.6
4.	Sanitize fish canning facilities.		2.9
	a.	Identify personal sanitation practices to follow.	3.1
	b.	Clean and sanitize floors and walls in cleaning room.	3.0
	c.	Clean and sanitize fish cutting tools.	3.0
	d.	Clean and sanitize floor and walls in butchering room.	2.9
	e.	Clean and sanitize racks and counters.	2.9
	f.	Identify sanitation requirements for licensing.	2.9
	g.	Select appropriate cleaning and sanitizing agents and equipment.	2.6
	h.	Evaluate influence sanitary conditions may have on fish spoilage.	2.5

RETAIL FISH CUTTER

Job Description:

The Retail Fish Cutter works in a retail store or in the meat department of a retail store. The Retail Fish Cutter works with records kept in the fish department, cutting fish, and displaying cuts of fish for sale. In general, the Retail Fish Cutter helps maintain inventories of fish on hand, maintains sanitary working areas; cuts fish; packages and displays fish, and assists in the purchasing and managing of the retail fish store.

Competencies Identified and Validated

N = 31*

Competencies	Weighted Mean**
1. Perform general office procedures.	2.3
a. Meet people.	3.0
b. Use telephone.	2.3
c. Write memos, letters, and notes.	2.1
d. File various items of information.	1.8
2. Record information.	2.5
a. Record customer order information.	3.1
b. Record inventory information on sheets.	2.4
c. Record amount of fish processed during day.	2.0
3. Inventory fish.	2.9
a. Remove damaged fish from inventory.	3.3
b. Take a physical inventory.	3.2
c. Determine amount of fish inventory on hand from records.	2.2
4. Follow legal regulations.	2.5
a. Display appropriate inspection certificates.	2.7
b. Interpret local, state, and federal inspection requirements.	2.3
5. Observe safety precautions.	2.8
a. Remove debris from work areas.	3.2
b. Follow safe work habits.	3.0
c. Correct potential safety hazards.	2.9
d. Apply first aid to minor cuts.	2.6
e. Identify potential safety hazards.	2.6
f. Wear appropriate work clothing.	2.6

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6.	Sell and display fish.	3.1
a.	Greet customers.	3.6
b.	Interpret customer's orders for various cuts.	3.6
c.	Price various fish for customers.	3.6
d.	Operate cash register.	3.6
e.	Weigh fish for customers.	3.6
f.	Describe various fish items to customers.	3.5
g.	Arrange fish displays.	3.4
h.	Receive customer orders by telephone.	3.3
i.	Put fish in counter.	3.2
j.	Stock fish displays.	3.2
k.	Label fish in display cases.	3.2
l.	Put ice in counter.	2.8
m.	Handle customer complaints.	2.7
n.	Prepare advertisement.	1.8
o.	Determine percent markup and profits.	1.6
7.	Receive fish shipments.	3.1
a.	Check material received against order.	3.5
b.	Inspect merchandise for damage.	3.5
c.	Record discrepancies on invoices.	3.4
d.	Sign shipping receipt.	3.1
e.	Help unload shipments.	2.9
8.	Use and maintain hand and power fish cutting tools and equipment.	2.5
a.	Use knives.	3.5
b.	Clean tools.	3.3
c.	Use power saw and equipment safely.	3.2
d.	Identify tools.	2.9
e.	Use saw.	2.9
f.	Use hand tools safely.	2.8
g.	Select appropriate tools and equipment for specific jobs.	2.5
h.	Sharpen tools.	2.5
i.	Use cutting board.	2.5
j.	Store tools.	2.3
k.	Use scaler.	2.3
l.	Adjust tools and equipment.	2.2
m.	Use plyers.	1.9
n.	Use dikes.	1.8
o.	Recondition tools.	1.0
9.	Package fish.	2.7
a.	Weigh fish for packaging.	3.5
b.	Select appropriate wrapping materials.	2.5
c.	Label packages for customers.	2.2
10.	Purchase fish and supplies.	2.2
a.	Determine what to order.	2.3
b.	Determine when to order.	2.3

c.	Determine the quantity of fish to keep on hand.	2.3
d.	Determine the amount to order.	2.2
e.	Compare and verify costs of fish from various suppliers.	1.9
f.	Identify various sources of fish suppliers.	1.9
11.	Cut fish.	3.1
a.	Steak fish.	3.4
b.	Fillet fish.	3.4
c.	Split fish in two.	3.3
d.	Cut off fins.	3.2
e.	Gut fish.	3.2
f.	Cut off head.	3.1
g.	Scale fish.	2.7
h.	Skin fish (cat fish).	2.6
12.	Refrigerate and store fish.	3.1
a.	Recognize signs of fish spoilage.	3.8
b.	Read thermometers in storage areas.	3.3
c.	Control temperature in storage areas.	3.0
d.	Determine freezer storage life of various fish.	2.8
e.	Determine temperature for fish storage areas.	2.7
f.	Evaluate influence temperature, humidity, and air circulation have on longevity of fish.	2.7
13.	Sanitize fish cutting facilities.	3.1
a.	Clean and sanitize fish cutting tools.	3.3
b.	Clean and sanitize display cases.	3.2
c.	Clean and sanitize floors, ceilings, and walls in the cutting room and cooler.	3.1
d.	Identify personal sanitation practices to follow.	3.1
e.	Clean and sanitize power fish cutting tools.	3.0
f.	Clean and sanitize racks and counters in the cutting room and cooler.	3.0
g.	Select appropriate cleaning and sanitizing agents and equipment.	2.9

NUT SORTER SUPERVISOR

Job Description:

The Sorter Supervisor has experience as a sorter and hence the qualifications of such. This worker is also involved in the keeping of daily records and reports, inspecting machinery and supervising personnel on the sorter belt. Experience as a leadman or foreman is important. A positive attitude towards people and a desire to carry out responsibility and manual labor are essential.

Competencies Identified and Validated

N = 30*

	Competencies	Weighted Mean**
1.	Have experience as a sorter.	3.6
2.	Understand U. S. Agriculture Inspection Standards.	3.5
3.	Complete daily reports and records.	3.3
4.	Inspect machines and equipment for proper operation.	3.2
5.	Have experience as a foreman.	3.2

NUT QUALITY CONTROL ANALYST (INSPECTOR)

Job Description:

The Quality Control Analyst performs tasks pursuant to maintaining production of a high quality product, makes analysis of the product; keeps and maintains running quality records and performs quality tests on designated samples. A general knowledge of all major nut varieties is essential, as is the ability to perform mathematical functions in addition, subtraction, multiplication, division and percentages.

Competencies Identified and Validated

N = 30*

	Competencies	Weighted Mean**
1.	Have experience as a sorter or tester.	3.3
2.	Keep and maintain records.	3.5
3.	Draw designated samples.	3.4
4.	Operate test scales.	3.5

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* Responses from 30 Workers and or their Work Supervisors in these occupations in the Nut Processing Industry. Survey conducted by Department of Agricultural Education, California State University, Chico, California 95926.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

5. Operate moisture tester.	2.7
6. Make analysis of the product.	3.6
7. Have knowledge of major nut varieties.	3.6
8. Recognize abnormalities in nuts.	3.7
9. Recognize quality problems.	3.8
10. Understand U. S. Agriculture Inspection Standards.	3.5

NUT SORTER

Job Description:

A Sorter is a person responsible for visual inspection of nuts moving on a belt. The inspection involves culling of nuts that are damaged or diseased, foreign material and low quality nuts. The job requires close work with other people for prolonged periods of time in a sitting or standing position. The job is seasonal and requires good health and eyesight (eyesight generally correctable to 20/30 or better). The sorter should not be susceptible to motion sickness. The ability to get along with others is highly important.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Identify abnormalities in nuts.	3.5
2. Identify qualities of nuts.	3.1
3. Understand terminology of the job.	3.0
4. Understand good social health habits.	3.3

NUT SORTING MACHINE OPERATOR

Job Description:

The Sorting Machine Operator is involved in the complete operation and maintenance of the sorting machine, keeping records, production tests, clean-up of machine/belt area and have at least a basic understanding of electrical engines and component parts. Many companies require the Sorting Machine Operator to have experience as a sorter and periodically relieve sorters on the belt. The Sorting Machine Operator should have no fear of machinery or the challenge of a malfunctioning machine.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Have experience as a sorter.	2.6
2. Operate electric sorting machine.	3.8
3. Be able to trouble-shoot machine.	3.2
4. Perform maintenance on machine.	2.8
5. Be able to disassemble or assemble machine for replacement of parts, cleaning, etc.	2.8
6. Keep records on machine.	2.8
7. Set up machine for operation.	3.5
8. Test product in flow for proper operation.	3.8

NUT TESTER (TEST CLERK)

Job Description:

The Tester is directly involved with the analysis of the product. This includes testing of samples as to quality, variety, and weight. The test clerk job differs from that of the tester solely by responsibility. (The primary difference being that the Tester Clerk makes the final determination of the sample analysis being correct.) Both areas require a person well able to get along with other people.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Have experience as sorter or related job.	2.4
2. Analyze samples of power lots.	3.4
3. Separate nut sample from all foreign and abnormal material.	3.8
4. Operate sample sheller.	3.3
5. Operate cleaner and moisture tester.	3.3
6. Operate scales and similar equipment.	3.8
7. Keep records.	3.7
8. Recognize major nut varieties.	3.6
9. Understand all test procedures.	4.0
10. Make fast cursory inspection of samples.	3.5

NUT BUYER

Job Description:

The primary duty of the Buyer is the purchase, or agreement to purchase, the nut product from the grower for the producing company. The job calls for personal contact with the grower, estimate of crop size and quality, and subsequent purchase (with "promise" or "future") of the product. The job calls for a broad knowledge of marketing and nut quality. The ability to get along with others and work under conditions in the field are essential.

Competencies Identified and Validated

N = 30*

Competencies		Weighted Mean**
1.	Estimate size of crop.	3.6
2.	Estimate quality of crop.	3.8
3.	Identify major nut varieties.	3.5
4.	Understand marketing procedures.	2.7
5.	Understand harvesting procedures.	3.4
6.	Understand plant operation.	2.5

NUT SANITARIAN

Job Description:

The Sanitarian is responsible for the control of rodents, insects, trash, and filth in and around the processing plant. Knowledge of rodents and insects, their damage potential, and technique, control, and disposal are important. Knowledge of use of sanitation equipment is essential.

Competencies Identified and Validated

N = 30*

Competencies		Weighted Mean**
1.	Have experience in janitorial duties.	2.5
2.	Have knowledge of cleaning and spraying equipment.	3.5
3.	Have knowledge of spray and fumigation materials.	3.8
4.	Have knowledge of traps and baits.	3.6
5.	Have knowledge of insect cycles and control.	3.3
6.	Have knowledge of rodent control.	3.8
7.	Operate forklift and rider sweeper.	2.3
8.	Clean, wash and sanitize sorting belts.	2.8

NUT MAINTENANCE MECHANIC

Job Description:

Under general supervision, the Maintenance Mechanic performs tasks in the maintenance and repair of various shelling and related equipment, and all mechanical equipment in and around the plant including trucks and forklifts. A thorough knowledge of tools and experience in the mechanic field is essential. Supervision of help is a major part of the job.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Maintain and repair various shelling and related equipment.	3.9
2. Maintain and lubricate all mechanical equipment.	3.8
3. Perform rough and finished carpentry work.	2.1
4. Install conduit and make electrical repairs.	2.8
5. Perform skilled work involving plumbing, electrical, plastering, and sheet metal work.	2.6
6. Install or remove and salvage equipment.	3.2

NUT MACHINE OPERATOR

Job Description:

With general supervision, the Machine Operator runs all cleaners, bleachers, hullers, etc. in the plant; directs product flow, adjusts machines, performs minor repairs and minor clerical duties. Good health and the ability to perform heavy manual duties is essential. A general knowledge of mathematics is important.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Operate all machinery involved with production.	3.9
2. Make flow adjustments.	3.8
3. Maintain equipment.	2.9
4. Perform repairs on equipment.	2.5
5. Perform minor clerical duties.	2.4

POULTRY AND EGG PROCESSING

Note: Because of circumstances beyond the control of the Director of this National Study, very late in the study an institution was obtained to survey the occupations in Poultry and Egg Processing. So late was the request unavoidably made, the institution in the short time available could only identify the many occupations in Poultry and Egg Processing before the deadline for printing this publication. However, because of the importance of this industry over the nation, the many occupations or job titles identified follow. *

POULTRY PROCESSING

Poultry processing plants or businesses over the country vary in size of operation from very small to large plants which process thousands of birds each day. In small poultry processing plants a worker will probably perform all operations or steps in the processing of poultry. In large plants, workers specialize and perform only one or two operations in the process.

In a large poultry processing plant, the following different occupations or job titles will usually be found. The occupation or job title fairly well describes the skills involved in each occupation.

1. Receiving, hanging, killing area workers.
2. Picking room, New York dress room workers.
    - Foreman, scalder.
    - Pinning line attendant.
    - Chiller operator.
3. Offal room attendant.
4. Eviscerating area workers.
    - Rehanger.
    - Bar cutter, vent cutter, stabber.
    - Body opener.
    - Eviscerator, drawer (hand).
    - Position-drawer, (automatic eviscerator).
    - Inspector - USDA.
    - Assistant to the inspector, trimmer.
    - Salvager.
    - Heart and liver harvester.
    - Gizzard cutter - harvester.
    - Gizzard machine operator.
    - Gizzard inspector (in house).
    - Neck popper, cutter, dislocator.
    - Cropper.
    - Lunger, lung remover.
5. Cut up and packing area workers.

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* Occupations identified by Poultry Science Division of the Agriculture Department, Modesto Junior College, Modesto, California 95352.

A. Ice pack - whole body workers.

- Rehanger - grader.
- Giblet transfer attendant.
- Giblet wrap machine attendant.
- Tagger (wing).
- Packer, Ice packer.
- Master scaler, weight recorder.
- Glue machine attendant, lidder.

B. Trade pack, packaging, further processing workers.

- Splitter-breast.
- Back cutter.
- Cut-up and package line workers.
- Wing cutter.
- Breast cutter.
- First leg cutter.
- Last leg cutter.
- Tray placer.
- Pad placer.
- Drum packer.
- Thigh packer.
- Breast packer.
- Wing or drummet packer.
- Labler.
- Wrapping machine feeder.
- Basket packer.
- Rewrap person, salvager.
- Wrap machine attendant.

C. Bag fryer line workers.

- Giblet placer.
- Bagger.
- Taper.
- Supply man.

D. Bulk parts workers.

- Saw operator.
- Deboner.
- Box machine attendant, box maker.
- Box supply man.
- Packer, packager, master carton packer.
- Weigh and price machine attendant.
- Scaler, master scaler.
- Manual labler.
- Sleeve wrap attendant, lid machine attendant.

6. Weigh and price area workers.

- Blast tunnel receiver.
- Product mover.
- Product feeder.
- Weigh and price lead man.

7. Loading dock workers.

    Stocker, cooler production.
    Truck loader.

8. Miscellaneous job occupations.

    Knife sharpener.
    Sanitation man.
    Tank man.
    Quality control technician.
    Foreman.
    Product supervisor.
    Training supervisor.

9. Plant maintenance workers.

EGG PROCESSING

Eggs are processed as a whole product or are processed as egg products. The occupations in this agricultural processing industry follow.

A. Shell egg processing plant employees.
    - Shipping and receiving workers.
    - Processing room workers.
        - Supervisor.
        - Transfer worker.
        - Machine loader.
        - Candlers and pick-off workers.
        - Packing machine operator.
        - Lineman or finish packers.
        - Cooler worker.
    - Shift supervisor, foreman.
    - Inspector.
    - Clean up worker, sanitation.

B. Egg products processing plant employees.
    - Receiving and transfer room workers.
        - Supervisor.
        - Floor worker.
        - Loader operator.
        - Scanner.
    - Breaking room workers.
        - Supervisor.
        - Floor worker.
        - Breaking machine operator.
    - Processing room workers.
        - Supervisor.
        - Churn operator.
        - Pasteurizer processor or operator.
    - Can-off room, packing workers.
    - Miscellaneous occupations.
        - Forklift driver.
        - Clean-up worker.

RICE SHIFT MILLER

Other Titles: Rice Miller, Shift Supervisor, Shift Manager, Shift Foreman, Relief Supervisor, Mill Supervisor.

Job Description:

The Rice Shift Miller is the miller and supervisor for his shift; is in charge of all milling of rice and the grading of the rice; must physically set the graders and check quality of the rice; knows the varieties, foreign material, and grade standards, according to specifications; keeps production up and gets the top yields from each barrel of rice; is in charge of all the machinery and the operations of it; takes care of the maintenance and the proper settings of the machines; is responsible for seeing that the mill areas are clean; is responsible for distributing rice to the proper locations according to quality, quantity, and variety; is responsible for keeping a close check on potential hazards in the mill; is in charge of all the personnel on his shift; sees that personnel does jobs correctly; is responsible for explaining and enforcing the safety and sanitation rules of the company to each new employee on his shift; fills in when necessary on any job, especially if short on personnel.

Competencies Identified and Validated

N = 34*

Competencies	Weighted Mean**
1. Mill and grade rice.	3.9
a. Check quality of the rice.	4.0
b. Know grade standards.	4.0
c. Physically set rice graders.	3.9
d. Know varieties of rice.	3.8
e. Distribute rice to proper location according to quality, quantity, and variety.	3.8
f. Be able to get top yield per barrel.	3.8
g. Know foreign material.	3.7
2. Machine and work area.	3.7
a. Properly set machines.	3.8
b. Oversee cleaning of work area.	3.8
c. Oversee cleaning and repair of machines.	3.7
d. Oversee daily maintenance of machines.	3.5

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* Responses from 34 Rice Shift Millers in four states. Survey conducted by Vocational Agriculture Department of Stuttgart High School, Stuttgart, Arkansas, and Department of Agricultural Education, University of Arkansas, Fayetteville, Arkansas 72701.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Safety and sanitation.	3.7
a.	Record injuries on proper forms.	3.9
b.	Check security.	3.9
c.	Explain company safety and sanitation rules to new employees.	3.8
d.	Supervise correct safety procedures.	3.7
e.	Check all guard and safety devices.	3.7
f.	Check on potential hazards.	3.7
g.	See that OHSA regulations are followed.	3.6
4.	Supervise personnel.	3.7
a.	Evaluate employees' work.	3.7
b.	Fill in when necessary on any job when short on personnel.	3.6

RICE HULLER PERSON

Other Titles: Sheller Operator, Pearler Operator, Rough Rice Miller.

Job Description:

The Rice Huller Person is responsible for reporting to the miller if any maintenance work is needed; is in charge of eighteen paddy machines to set for the best separation of the brown rice from the paddy rice; keeps the machines oiled and cleaned and does minor repairs; is in charge of forty pearlers; must match each of the machines as to what grade of rice is being miller, does minor repairs and keeps the pearlers oiled and cleaned; helps take care of the rough rice monitors and the setting of the feed on these monitors; helps keep monitors in working condition; takes care of the rough rice scales; keeps the feed set to take care of the amount of rough rice conveyed into the mill; helps with the clean-up duties and sometimes supervises some of the crew.

Competencies Identified and Validated

N = 32*

Competencies	Weighted Mean**
1. Operate shellers.	3.3
a. Set up sheller machines to receive the highest yield possible.	3.9
b. Do minor repairs.	3.5
c. Keep machines clean.	3.1
d. Keep machines oiled.	2.6
2. Operate paddy machines.	3.4
a. Get best separation of brown and paddy rice.	4.0
b. Keep machines clean.	3.3
c. Do minor repairs.	3.3
d. Keep machines oiled.	3.1
3. Operate pearlers.	3.5
a. Set machine as to what grade of rice to mill.	4.0
b. Do minor repairs.	3.8
c. Keep machine clean.	3.3
d. Keep machine oiled.	3.1

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* Responses from 32 Rice Hullers in four states. Survey conducted by Vocational Agriculture Department of Stuttgart High School, Stuttgart, Arkansas, and Department of Agricultural Education, University of Arkansas, Fayetteville, Arkansas 72701.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	e.	Help to keep lime on rice. #	
4.		Operate rough rice monitors.	3.9
	a.	Must be able to set feed.	4.0
	b.	Must be able to trouble shoot monitor.	4.0
	c.	Must be able to do simple repair work.	3.8
5.		Operate rough rice scales.	3.5
	a.	Must be able to set feed control of rough rice.	3.9
	b.	Must be able to adjust rice coming into mill.	3.5
	c.	Must know varieties of rough rice. #	
6.		Clean-up duties.	3.2
	a.	Know sanitation practices.	3.3
	b.	Must be able to leave shift area orderly for next person.	3.3
	c.	Operate clean-up equipment.	2.9
7.		Supervise workers.	2.9
	a.	Develop harmonious relationships with workers.	3.5
	b.	Train workers for various jobs.	3.5
	c.	Suggest to workers improvements of methods of accomplishment of work.	3.0
	d.	Observe employee compliance to safety regulations.	2.8
	e.	Assist in planning work schedules of employees.	2.5
	f.	Judge prospective employee qualifications.	2.4

Not included on questionnaire but recommended by some experts surveyed.

RICE MILL MAINTENANCE PERSON

Other Titles: Repair Crew Person, Mill Repair Person, Skill Rice Mill Maintenance Person.

Job Description:

The Rice Mill Maintenance Person performs tasks that require knowledgeable skill of welding, cutting, and brazing; must have knowledge of basic mechanical techniques such as gear drives, chain and belt drives, as well as other types of mechanical movements; needs a working knowledge of basic geometry; must be able to work well with other employees; must have basic knowledge of all aspects of mechanical work; must keep equipment in operation; is responsible for seeing that the work is done; must operate safely and repair equipment in compliance with OHSA rules and regulations.

Competencies Identified and Validated

N = 28*

Competencies			Weighted Mean**
1.	Electric weld.		3.3
	a.	Flat Weld.	3.9
	b.	Vertical weld.	3.9
	c.	Overhead weld.	3.9
	d.	Hardsurface weld.	3.8
	e.	Weld cast iron.	3.2
	f.	Run wire machine.	1.3
2.	Gas weld.		3.3
	a.	Cut metal.	3.9
	b.	Braze metal.	3.8
	c.	Weld cast iron.	3.7
	d.	Use steel rod.	3.1
	e.	Sweat copper tubing.	2.1
3.	Cold metal work.		3.2
	a.	Form metal.	3.9
	b.	Braze metal.	3.9
	c.	Grind metal.	3.7
	d.	Cut metal mechanically.	2.2
4.	Mechanical knowledge.		3.1
	a.	Understand gear drives.	3.9

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* Responses from 28 Rice Mill Maintenance Persons from four states. Survey conducted by Vocational Agriculture Department of Stuttgart High School, Stuttgart, Arkansas, and Department of Agricultural Education, University of Arkansas, Fayetteville, Arkansas 72701.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Understand chain drives.	3.9
c.	Understand belt drives.	3.8
d.	Understand how to use combination of drives for best effect.	3.1
e.	Understand hydraulic drives.	2.1
f.	Understand leveler drives.	1.9
5.	Sheet metal layout.	3.4
a.	Fit duct work.	3.9
b.	Install new machine with proper duct work and brazing.	3.8
c.	Solder.	3.1
d.	Form sheet metal.	3.1
e.	Lay out angles.	2.9
6.	Safety.	4.0
a.	Work safely.	4.0
b.	Respect safety of others.	4.0
c.	Understand how to install machines for proper working safety.	3.9
d.	Know and follow OHSA rules in installing safety rail guards, etc.	3.9
7.	Electricity.	3.6
a.	Must be able to work safely with electric currents.	3.9
b.	Understand difference in 110, 220, 330, and 440 current.	3.8
c.	Must be able to install simple machines on various currents.	3.1

SWEET POTATO PROCESSOR

Job Description:

Sweet Potato Processors may grow the crop but most often they process the crop grown by farmers in the community. The Processor must prepare and can sweet potatoes for the market. Most processing plants operate for only a few months each year.

Competencies Identified and Validated

N = 30*

Competencies			Weighted Mean**
1.	Receiving.		3.5
	a.	Know defects.	3.6
	b.	Know grades.	3.5
	c.	Know size.	3.4
2.	Peeling.		3.1
	a.	Know lye solution.	3.3
	b.	Know abrasive surface to use.	3.1
	c.	Know size to cut.	3.1
	d.	Know speed to use.	3.0
3.	Testing.		3.2
	a.	Test bacteria before cooking.	3.4
	b.	Test bacteria after cooking.	3.4
	c.	Check specific gravity.	3.2
	d.	Check acidity.	3.1
	e.	Test for nutrient level.	3.0
	f.	Know pH level.	2.9
4.	Canning.		3.4
	a.	Operate sealer.	3.5
	b.	Know time to cook.	3.5
	c.	Know temperature to cook.	3.4
5.	Insect and disease control.		3.8
	a.	Know controls for insects and diseases.	3.8
	b.	Know local, state, and federal pesticide laws.	3.8
	c.	Identify insect and disease damage.	3.8
	d.	Determine sprayer calibration.	3.6
	e.	Know cultivator equipment.	3.5

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* Responses from 30 Sweet Potato Processors in Louisiana. Survey conducted by Department of Agricultural Education, Louisiana State University, Baton Rouge, Louisiana 70803.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

6.	Weed control.		3.6
	a.	Identify weed variety.	3.7
	b.	Know local, state, and federal herbicide laws.	3.6
	c.	Determine sprayer calibration.	3.6
	d.	Know cultivator equipment.	3.5
	e.	Know controls for weeds.	3.5
7.	Harvesting.		3.6
	a.	Determine when the sweet potato is mature.	3.8
	b.	Maintain safety standards.	3.7
	c.	Adjust equipment for harvest.	3.6
	d.	Hire and train labor needed.	3.5
	e.	Determine hauling needed.	3.4
	f.	Determine yield.	3.4
	g.	Determine containers necessary.	3.4
8.	Market sweet potatoes.		3.5
	a.	Know local market prices.	3.7
	b.	Know and determine grades.	3.6
	c.	Market the crop.	3.5
	d.	Determine proper curing and storage.	3.5
	e.	Know future market.	3.4
	f.	Determine transportation cost.	3.3
9.	Record keeping.		3.4
	a.	Record income and expenses.	3.5
	b.	Know wage scales and laws.	3.5
	c.	Determine fuel needed.	3.4
	d.	Keep labor records.	3.4
	e.	Know money sources.	3.4
	f.	Know occupational and health safety laws.	3.4
	g.	Calculate interest.	3.4

WOOL BUYER

Job Description:

Purchases wool for processors on contract basis or for resale. Examines fleece and inspects samples of wools for fineness, color, length of fiber, amount of reject wool (seedy burry, dead and black) natural grease, and foreign matter present to ascertain market value. Offers price to seller on lot or graded basis. Contacts grower to bid on larger lots or on pools of several growers, sorts and grades purchased fleece according to texture and length of fiber. Shakes out fleece to remove dust and picks out burrs, sticks, strings, and mud. May be required to be licensed. May buy independently to resale at profit.

Competencies Identified and Validated

N = 31

Competencies		Weighted Mean**
1.	Have a good knowledge of judging and showing sheep.	0.9
	a. Know how to groom and block sheep.	0.9
	b. Know the tools and materials used in grooming and blocking sheep.	0.9
2.	Have a good knowledge of the history of sheep.	2.9
	a. Know the fine-wool breeds.	3.3
	b. Know the medium-wool breeds.	3.2
	c. Know the long-wool breeds.	3.2
	d. Know the different breeds of sheep.	2.9
	e. Know the difference between native and Western production.	2.8
	f. Distinguish the wool breeds of sheep from the meat breeds of sheep.	2.7
	g. Be able to distinguish breed of sheep by wool sample.	2.7
	h. Know the fur sheep breeds.	2.4
3.	Have mathematical abilities.	3.1
	a. Can multiply and divide proficiently.	3.9
	b. Can add and subtract proficiently.	3.8
	c. Can use algebra proficiently.	1.7

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* Responses from 31 Wool Buyers in 11 states. Survey conducted by Department of Vocational Agriculture Education, University of Wyoming, Laramie, Wyoming 82071.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4.	Have a knowledge of the distribution of sheep and/or wool production.		3.0
	a.	United States.	3.1
	b.	Leading states in production of sheep/wool.	3.1
	c.	World.	2.9
5.	Possess desirable personal qualities and qualifications.		3.6
	a.	Demonstrate a willingness to work.	3.8
	b.	Be honest and sincere.	3.8
	c.	Demonstrate the ability to work on their own.	3.7
	d.	Demonstrate a willingness to learn or take supervision.	3.7
	e.	Demonstrate the ability to get along with others.	3.6
	f.	Demonstrate the ability to project a desirable image for the firm.	3.6
	g.	Demonstrate a positive job attitude about the organization when working with fellow employees, potential customers and producers.	3.6
	h.	Demonstrate the ability to follow directions of supervisor.	3.6
	i.	Budget time wisely.	3.5
	j.	Maintain a satisfactory attendance record.	3.5
	k.	Demonstrate acceptable personal appearance and personal hygiene.	3.5
	l.	Accept routine tasks without becoming disinterested.	3.4
6.	Practice good human relations.		3.5
	a.	Keep customer's financial records confidential.	3.6
	b.	See and report the customer's point of view.	3.4
	c.	Be a good listener.	3.4
7.	Can accurately calculate the amount of:		3.8
	a.	Reject wool.	3.9
	b.	Shrink.	3.9
	c.	Dockage.	3.7
8.	Can accurately determine:		3.7
	a.	Staple length.	3.9
	b.	Wool fineness.	3.9
	c.	Grade of wool.	3.9
	d.	What price wool is worth in grease.	3.9
	e.	Staple diameter.	3.8
	f.	Wool color.	3.8
	g.	Cost of transportation.	3.8
	h.	Fiber strength.	3.8
	i.	Cost per wool grade.	3.7

	j.	What price wool is worth by mental process.	3.6
	k.	Cost of dockage.	3.6
	l.	Kemp.	3.6
	m.	Cost of shrink.	3.5
	n.	Cost of present black wool.	3.5
	o.	Crimp.	3.2
9.		Know storage and handling procedure.	3.2
	a.	Know how to sort wool.	3.4
	b.	In a warehouse.	3.2
	c.	Individual grower.	3.2
	d.	Know how to open wool bags for inspection.	3.2
	e.	Handle fleece without untieing it.	3.2
	f.	In cooperatives.	3.1
10.		Know how to contact for purchase of wool.	3.4
	a.	Individual wool growers.	3.8
	b.	Warehouses dealing in wool storage.	3.8
	c.	Cooperative wool grower associations.	3.7
	d.	Hide and junk dealers.	2.4
11.		Knowledgeable and skillful in arranging for transportation.	3.1
	a.	By train.	3.7
	b.	By truck.	3.6
	c.	By air.	1.7
12.		Be able to remember about how much of each grade in:	3.4
	a.	A lot.	3.7
	b.	A warehouse.	3.2
	c.	Car load.	3.1
13.		Have knowledge of wool on hand by their employer.	3.1
	a.	Know where wool is being stored.	3.2
	b.	Know the sources of wool on hand.	3.2
	c.	Know how long present supply will last.	2.9
14.		Can estimate reasonably close future market for wool.	3.4
	a.	Know kind or type of wool in greatest demand.	3.5
	b.	Is sensitive to market trends.	3.4
	c.	Is aware of seasonal price changes.	3.4
15.		Have good knowledge of wool buying competition.	3.2
	a.	Other wool buyers.	3.7
	b.	Other companies.	3.7
	c.	Other countries.	2.8
	d.	Hide and junk dealers.	2.4

WOOL GRADER

Job Description:

Inspects wool to sort and grade it according to length of fiber, color, and degree of fineness, utilizing sight, touch, experience, and established specifications. Shakes fleece over screen-topped table to remove dust. Picks out foreign matter, such as burrs, sticks, strings, and cinders. Breaks fleece into pieces and inspects and sorts them according to quality.

Competencies Identified and Validated

N = 16

Competencies	Weighted Mean**
1. Have a good knowledge of judging and showing sheep.	1.4
a. Know how to groom and block sheep.	1.4
b. Know the tools and materials used in grooming and blocking sheep.	1.4
2. Have a good knowledge of the history of sheep.	2.7
a. Know the fine-wool breeds.	3.0
b. Know the medium-wool breeds.	3.0
c. Know the long-wool breeds.	2.9
d. Know the difference between Native and Western production.	2.9
e. Distinguish the wool breeds of sheep from the meat breeds of sheep.	2.7
f. Know the long-wool breeds.	2.9
g. Know the fur sheep breeds.	2.5
h. Be able to distinguish breed of sheep by wool sample.	2.4
3. Have mathematical abilities.	2.2
a. Can add and subtract proficiently.	2.8
b. Can multiply and divide proficiently.	2.8
c. Can use algebra proficiently.	1.0
4. Have a knowledge of the distribution of sheep and/or wool production.	2.2
a. United States.	2.3

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* Responses from 16 Wool Graders in 10 states. Survey conducted by Department of Vocational Agriculture Education, University of Wyoming, Laramie, Wyoming 82071.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	World.	2.1
	c.	Leading states in production of sheep/wool.	2.1
5.	Possess desirable personal qualities and qualifications.		3.3
	a.	Demonstrate a willingness to work.	3.6
	b.	Demonstrate a willingness to learn or take supervision.	3.6
	c.	Demonstrate the ability to follow directions of supervisor.	3.6
	d.	Be honest and sincere.	3.5
	e.	Maintain a satisfactory attendance record.	3.4
	f.	Demonstrate a positive job attitude about the organization when working with fellow employees, potential customers and producers.	3.4
	g.	Demonstrate the ability to work on their own.	3.2
	h.	Accept routine tasks without becoming disinterested.	3.1
	i.	Demonstrate acceptable personal appearance and personal hygiene.	3.0
	j.	Demonstrate the ability to get along with others.	3.0
	k.	Budget time wisely.	2.9
	l.	Demonstrate the ability to project a desirable image for the firm.	2.8
6.	Can accurately calculate the amount of:		3.1
	a.	Reject wool.	3.3
	b.	Dockage.	3.0
	c.	Shrink.	3.0
7.	Can accurately determine:		2.9
	a.	Staple length.	3.8
	b.	Wool fineness.	3.8
	c.	Grade of wool.	3.8
	d.	Staple diameter.	3.6
	e.	Wool color.	3.5
	f.	Fiber strength.	3.5
	g.	Kemp.	3.4
	h.	Crimp.	3.1
	i.	Cost per wool grade.	2.5
	j.	What price wool is worth by mental process.	2.4
	k.	Cost of dockage.	2.3
	l.	Cost of shrink.	2.2
	m.	Cost of present black wool.	2.1
	n.	What price wool is worth in grease.	2.1
	o.	Cost of transportation.	1.8
8.	Know storage and handling procedure.		3.0
	a.	Know how to open wool bags for inspection.	3.6

	b.	Know how to sort wool.	3.5
	c.	Handle fleece without untieing it.	3.1
	d.	In a warehouse.	2.8
	e.	In cooperatives.	2.6
	f.	Individual grower.	2.5
9.		Be able to remember about how much of each grade in:	2.2
	a.	A lot.	2.6
	b.	A warehouse.	2.1
	c.	A car load.	2.0
10.		Have knowledge of wool on hand by their employer.	2.2
	a.	Know where wool is being stored.	2.4
	b.	Know the sources of wool on hand.	2.4
	c.	Know how long present supply will last.	1.9
11.		Can estimate reasonably close future market for wool.	1.7
	a.	Aware of seasonal price changes.	1.8
	b.	Know kind or type of wool in greatest demand.	1.7
	c.	Is sensitive to market trends.	1.6

HORTICULTURE

Persons who work in occupations that specialize in planting, caring for, and marketing trees, shrubs, plants, flowers, and turf areas are included in this study as being employed in the instructional area of Horticulture. Occupations surveyed in Horticulture can be found on the below pages.

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ARBORICULTURE OCCUPATIONS

Other Titles: Trainee, Groundman, Climber, Foreman, Superintendent, Manager.

Job Description:

Persons in these occupations transplant, prune, repair, protect, and shape trees and shrubs. They remove unwanted trees and shrubs, remove growth obstructing utility lines, and control brush in utility rights-of-way. Persons in these occupations must be physically strong, mechanically inclined, and have little fear of heights. They usually are employed by private business services, by municipalities, or by utility companies.

Competencies Identified and Validated

N = 131*

Competencies	Weighted Means by Occupation**				
	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
1. Interview and select prospective employees.	.2	.3	.5	2.5	3.6
a. Interview and select prospective employees.	.2	.3	.5	2.5	3.6
2. Work with customers and prepare estimates and bills.	.4	.7	1.0	2.8	3.5
a. Handle customer or public complaints before and after tree work.	.4	.8	1.3	3.5	3.9
b. Work with tree wardens, police, and representatives of utilities in planning work.	.3	.5	.9	3.0	3.8

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* Competencies for the five occupations are composites of 131 responses from commercial, municipal, utility, and research and extension arborists, in 31 states and Canada. Survey conducted by the Agricultural/Agribusiness/Natural Resources Education Unit, Division of Vocational Education, New Jersey Department of Education, Trenton, New Jersey 08625.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

Competencies	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
c. Prepare estimates for competitive bidding and private work.	.2	.3	.5	2.1	3.5
d. Prepare bills for work performed.	.2	.3	.4	1.6	3.5
e. Advise property owners of tree work and obtain permission for work.	.4	.9	1.5	3.5	3.5
f. Post signs or distribute circulars announcing future tree work.	.8	1.1	1.1	2.8	2.7
3. Plan work schedules.	.3	.5	1.0	3.3	3.6
a. Prepare daily work assignment sheets.	.2	.4	.8	3.2	3.6
b. Prepare work report forms.	.3	.6	1.2	3.3	3.5
4. Inspect work in progress.	.3	.4	.9	3.3	3.8
a. Check crew production and performance.	.3	.4	.9	3.3	3.8
b. Tie appropriate knots for tree climbing and limb lowering operations.	2.2	2.9	4.0	3.7	2.0
c. Prune trees in accordance with industry standards.	2.0	2.0	4.0	3.7	2.0
d. Handle rope for lowering limbs.	2.5	3.7	3.7	3.5	1.7
e. Operate aerial lift device.	1.5	1.9	3.6	3.6	1.8
f. Position outriggers on aerial lift equipment.	1.7	2.6	3.5	3.6	1.7
g. Hoist tools to climbers using rope and bucket.	2.3	3.6	2.8	3.1	1.3
h. Prune and shear shrubs for form and compactness.	1.6	2.6	2.7	3.0	1.7

Competencies	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
6. Prevent and control diseases and other tree enemies.	1.3	1.8	2.0	3.0	2.7
a. Disinfect pruning tools to prevent spread of disease.	2.2	2.7	3.2	3.0	1.7
b. Identify insect damage to trees and shrubs, and insect causing damage.	1.1	1.4	2.1	3.3	3.8
c. Identify fruiting body of fungus.	.9	1.1	1.7	2.9	3.5
d. Identify pollution damage to trees.	.8	1.0	1.6	2.8	3.6
e. Identify lightning damage to trees.	1.0	1.2	2.3	3.3	3.6
f. Identify and report girdling roots.	1.0	1.6	2.4	3.2	3.3
g. Mix chemicals for spray applications.	1.1	2.0	2.0	3.6	2.4
h. Select pesticides, fungicides, surfactants, and thickeners for spray operations.	.5	.9	1.1	2.9	3.6
i. Select appropriate nozzles and pump pressures for spray operations.	.6	1.1	1.4	3.3	3.2
j. Determine when conditions are suitable for spray operations.	.5	1.0	1.3	3.6	3.5
k. Check for open windows and doors and cover pools, toys, pet dishes, etc.	1.8	2.7	2.4	3.4	2.1
l. Operate power spray equipment.	1.2	2.2	2.5	3.3	1.6
m. Handle spray hose for spray applicator.	2.1	3.0	2.3	2.6	1.2
n. Clean sprayer and truck after spray operations.	2.4	3.0	2.2	2.5	1.2

Competenciees	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
o. Dispose of spray containers and excess spray materials in approved manner.	1.7	2.5	2.2	3.2	1.8
7. Practice safe work habits.	1.7	2.4	2.3	3.1	2.5
a. Position and steady ladders for climbers.	2.6	3.4	2.6	3.0	1.3
b. Act as flagman on major traffic arteries.	2.9	3.5	2.4	2.8	1.4
c. Raise kytoons or place signals for aerial spray operations.	1.4	2.1	1.4	2.2	1.1
d. Operate two-way radio.	1.3	2.0	2.2	3.0	2.8
e. Administer first aid.	2.2	3.1	3.3	2.8	3.2
f. Participate in tree accident rescue operations.	2.0	2.9	3.6	3.7	2.8
g. Develop training and safety programs for employees.	.3	.6	1.1	2.8	3.9
h. Fill out accident report forms.	.7	1.0	1.5	3.6	3.6
i. Notify power companies and police of downed wires.	1.3	1.6	2.2	3.6	3.5
j. Place sign and barrier for pedestrian and traffic control.	2.1	3.1	2.5	3.3	1.9
k. Direct and control pedestrian and vehicular traffic in work area.	2.4	3.2	2.2	3.2	1.8
8. Identify trees and shrubs.	1.2	1.6	2.3	3.2	3.6
a. Identify common species of trees for the geographical area.	1.4	2.0	3.0	3.7	3.7
b. Use dichotomous key in the process of identifying uncommon trees.	.9	1.1	1.6	2.7	3.4

Competencies		Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
9.	Fertilize trees and shrubs.	1.4	2.0	1.9	2.7	1.8
a.	Collect and package soil samples.	1.1	1.5	1.4	2.9	2.5
b.	Determine type and amounts of fertilizer required for fertilization of trees and shrubs.	.7	1.0	1.3	2.9	3.3
c.	Punch or drill holes in root zone for fertilization.	2.0	2.8	2.4	2.6	1.2
d.	Spray soluble fertilizer for foliar feeding of trees.	1.3	2.2	2.2	2.8	1.2
e.	Apply fertilizer or lime by hand or spreader.	1.8	2.6	2.1	2.4	1.0
10.	Protect trees and shrubs.	1.3	2.0	2.4	2.6	1.4
a.	Determine method or type of lightning protection system to be installed.	.5	.8	1.4	2.6	3.1
b.	Attach tree air terminals or points and connect down conductors.	.7	1.1	2.7	2.7	1.3
c.	Measure and cut cable for lightning protection systems.	1.2	2.0	2.3	2.6	1.2
d.	Dig trenches to extend down conductors beyond root area.	1.8	2.5	1.9	1.9	1.0
e.	Drive grounding rods into ground.	1.8	2.6	1.9	2.1	1.0
f.	Clean, treat and fill cavities in trees above ground level.	1.1	1.6	2.9	3.0	1.4
g.	Clean, treat and fill basal cavities at ground level.	1.2	2.3	2.5	2.9	1.4
h.	Mix mortar or commercial preparations for filling cavities.	1.7	2.6	2.2	2.5	1.8

Competencies	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
i. Brace cavities with bolts or rods.	1.2	2.0	2.9	3.0	1.4
j. Cut and prepare sheet metal for covering cavities.	1.3	2.2	2.3	2.4	1.2
k. Drill holes and install drains in cavities as required.	1.2	2.0	2.7	2.7	1.2
l. Brace or cable established trees above ground level.	1.1	1.5	3.1	3.0	1.4
m. Measure and cut cable for cabling operations.	1.4	2.0	2.8	2.9	1.3
n. Insert screw rods for separating parallel branches.	1.4	1.7	3.0	2.8	1.2
o. Cut pipe for use in covering bracing bolts.	1.4	2.3	2.3	2.4	1.1
p. Construct stone dry-wells around trees for raising grade.	1.6	2.6	1.9	2.5	1.4
q. Remove girdling roots with appropriate tools.	1.3	2.1	2.5	2.9	2.1
11. Transplant trees and shrubs.	1.7	2.6	2.1	2.5	1.3
a. Root prune trees to be transplanted.	1.5	2.7	2.3	2.8	1.5
b. Dig and comb soil from roots of trees to be transplanted bareroot.	1.7	2.6	2.0	2.5	1.2
c. Dig, ball, and burlap trees to be transported.	1.9	2.7	2.3	2.6	1.4
d. Tie back branches of trees to be transported.	1.9	2.7	2.3	2.6	1.4
e. Dig holes to receive transplanted trees.	2.2	2.9	2.2	2.3	1.3
f. Backfill soil around transplanted trees.	2.3	2.9	2.1	2.4	1.2

Competencies	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
g. Operate tree spade in transplanting operations.	1.0	2.0	2.0	2.7	1.3
h. Operate back-hoe in transplanting operations.	.9	2.0	1.8	2.5	1.1
i. Guy newly transplanted trees.	1.8	2.7	2.4	2.8	1.4
j. Cut wire and hose or plastic ties for guying purposes.	2.1	2.7	2.6	2.5	1.2
k. Cut deadman anchors from cedar or locust for guying.	1.7	2.4	1.9	2.1	1.0
l. Dig trenches for installing deadman anchors.	2.0	2.6	1.8	2.0	1.0
m. Drive or bury posts or stakes for guying.	2.1	2.7	2.0	2.1	1.1
n. Operate front-end loader for moving soil in grading operations.	1.1	2.3	1.9	2.5	1.2
o. Install drainage tiles around tree when grade is raised.	1.5	2.6	2.0	2.6	1.4
p. Construct wall around tree when grade is lowered.	1.4	2.5	1.8	2.5	1.3
q. Remove soil with hand or power equipment in grade lowering.	1.6	2.5	1.8	2.3	1.2
r. Treat, prune, and repair roots damaged in grade lowering or excavation.	1.4	2.5	2.3	2.8	1.5
12. Fell and dispose of unwanted trees.	1.6	2.8	2.4	2.6	1.3
a. Fell and cut up trees using power chain saw.	1.7	3.1	3.5	3.4	1.6
b. Handle ropes for pull-lines and lowering limbs and sections.	2.0	3.5	3.2	3.2	1.5

Competencies	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
c. Operate tree crane for removing sections in tree removal process.	.8	1.8	2.2	3.0	1.3
d. Operate hydraulic log splitter.	1.3	2.5	1.9	2.3	1.1
e. Operate stump cutter.	1.1	2.5	2.1	2.7	1.3
f. Cut up stumps using power or hand tools.	1.5	2.8	2.2	2.4	1.2
g. Fill depressions resulting from stump removal operations with chips and soil.	2.2	2.9	2.1	2.2	1.2
h. Control brush by application of foliar, basal, dormant stem or stump sprays.	1.4	2.5	2.1	2.8	1.7
i. Feed limbs or brush into chipper.	2.3	3.6	2.7	2.6	1.3
j. Operate grapple loader.	.9	2.0	2.0	2.5	1.1
k. Operate log chipper.	1.0	2.0	1.7	2.1	1.0
l. Load and unload logs from flatbed truck.	1.8	2.8	2.2	2.5	1.2
m. Load limbs and debris on dump truck.	2.5	3.4	2.5	2.5	1.2
n. Drive and operate dump truck for disposal of brush and debris.	2.0	3.2	2.5	2.8	1.3
13. Maintain equipment.	1.6	2.5	2.5	2.9	1.6
a. Inspect, service, and repair aerial lift equipment.	1.0	1.5	2.7	3.4	2.1
b. Submit periodic equipment status reports.	.6	1.1	1.8	3.5	3.4
c. Fuel, service, and replace worn teeth on stump cutter.	1.2	2.3	1.9	2.6	1.3
d. Operate and maintain rotary brush saw.	1.4	2.5	2.1	2.3	1.1

Competencies	Trainee	Groundman	Climber	Foreman	Manager/ Superintendent
e. Lubricate moving parts and check hydraulic system on power equipment.	1.5	2.7	2.7	3.3	1.5
f. Inspect, coil, pile, or suspend rope for storage.	1.7	2.8	3.2	3.4	1.6
g. Refuel gasoline engines.	2.4	3.2	2.7	2.7	1.3
h. Drain and change oil and filters.	1.7	2.5	2.1	2.4	1.3
i. Change and repair tires on equipment.	1.6	2.2	1.8	2.1	1.2
j. Replace and/or repair chains on chain saw.	1.6	2.8	3.0	3.3	1.5
k. Sharpen blades for chain or hand saws.	1.4	2.6	3.1	3.2	1.5
l. Keep tool storage area on truck clean and orderly.	2.5	3.2	3.0	3.1	1.5

FLORICULTURE - DELIVERY PERSON

Other Titles: Driver

Job Description:

A Floral Delivery Person is responsible for prompt, reliable delivery service of floral arrangements and plant materials to the customer. His or her duties include: taking customer orders, making sales transactions, and guaranteeing careful handling of floral pieces and plants. He or she is responsible for operating and maintaining the delivery vehicle (safety and repair). This occupation is often seasonal or part-time, depending on the size of the business operation.

Competencies Identified and Validated

N = 36*

Competencies	Weighted Mean**
1. Communication skills.	3.1
a. Exhibit courteous, considerate, and respectful conduct.	3.7
b. Present a clean, conscientious, neat appearance.	3.6
c. Listen effectively, write clearly, and speak effectively in customer relations.	3.4
d. Understand customer's problems and handle complaints with tact.	3.2
e. Keep accurate records.	2.8
f. Make decisions concerning business dealings when necessary and make evaluations of various business endeavors.	1.5
2. Business management.	3.2
a. Be a licensed driver.	4.0
b. Be familiar with customer territory and be capable of successful use of a road map.	3.7
c. Properly plan and execute delivery route with economy and efficiency (gas mileage and time).	3.6
d. Practice courtesy in social and business situations.	3.5
e. Package, label, and review orders for correct delivery (timing/location).	3.5

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* Responses from 36 Floral Delivery Persons in 25 states. Survey conducted by Department of Agricultural Education, University of Rhode Island, Kingston, Rhode Island 02881.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Make accurate sales transactions and give receipts properly.	2.1
	g.	Know price range of flowers and plants.	1.9
	h.	Load a delivery truck in proper sequence for delivery, as well as using methods that avoid damage to flowers and plants.#	
3.	Floriculture skills.		2.7
	a.	Avoid travel damage; capable of minor adjustments before delivery, and know where and when to leave an arrangement.	3.6
	b.	Able to identify possible mistakes in an order.	2.9
	c.	Know basic plant identification.	2.2
	d.	Advise customers on basic plant care (water, light, temperature) and placement of arrangements when asked.	2.1
	e.	Avoid freezing or heat damage to flowers and plants being delivered.#	
	f.	Can effectively pick up incoming shipments and prepare live plant material for storage and/or display.#	
4.	Auto/mechanical skills.		3.2
	a.	Operate vehicle safely and cautiously.	3.9
	b.	Know when to contact mechanic (major repairs).	3.1
	c.	Operate, maintain, and make minor repairs on the service vehicle.	2.5
	d.	Clean and wash the delivery vehicle.#	

# Not included in questionnaire but recommended by some experts surveyed.

FLORICULTURE - SALESPERSON

Other Titles: Designer, Delivery Person, Florist Assistant.

Job Description:

A salesperson deals with people, goods, and services. He or she must have a knowledge and understanding of available plant materials, supplies, and accessories in the shop. His or her duties include advising and recommending arrangements to the customer, demonstrating various floral products, and explaining price differences. He or she must tactfully handle customer requests and complaints, prepare window displays, maintain a clean and appealing showroom, and should understand basic business principles. In a small flower shop this person may also serve as a designer and/or delivery person.

Competencies Identified and Validated

N = 30*

Competencies		Weighted Mean**
1.	Communication skills.	3.7
	a. Conduct self in a courteous, considerate, and concerned manner.	3.9
	b. Be sincere and demonstrate concern in meeting customer needs and interests.	3.8
	c. Acquire customer as well as business associates' respect and present a clean, conscientious appearance.	3.7
	d. Speak and listen effectively and write clearly.	3.6
	e. Handle customer complaints and problems with patience, understanding, and tact.	3.4
2.	Business management.	3.2
	a. Take orders correctly and be flexible in adjusting or altering items to the customer's specifications.	3.7
	b. Advise customers about materials and services available.	3.5
	c. Make accurate sales and credit card transactions and keep precise records.	3.5

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* Responses from 30 Floriculture Sales Personnel in 26 states. Survey conducted by Department of Agricultural Education, University of Rhode Island, Kingston, Rhode Island 02881.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

d.	Understand national and world wide floral delivery procedures.	3.4
e.	Maintain an attractive showroom and clean work area.	3.3
f.	Understand shop pricing policy and practices.	3.3
g.	Assist with advertising and promotional information.	2.0
h.	Be familiar with delivery routes, time schedule and delivery policies.#	
3.	Floriculture (task-oriented) skills.	3.2
a.	Know flowers, plants, supplies, and accessories and their availability.	3.6
b.	Know plant requirements (water, light, temperature) and also "special use" plants and flowers (shade, sun, dry, wet, long/short lived).	3.4
c.	Give advice to customers on proper plant care and handling, seasonal availability, and price fluctuations.	3.3
d.	Understand principles of floral design and color.	3.3
e.	Know basic designs and approximate time it takes to make specific items (for customer information).	3.0
f.	Responsible for immediate care such as watering, potting, transplanting, cutting, and reconditioning.	2.7
g.	Know how to receive a shipment of cut flowers and/or plants and how to process them for storage and/or display.#	
h.	Be able to wrap or package floral designs and plants for carrying by customers and for delivery.#	

Not included on questionnaire but recommended by some experts surveyed.

FLORICULTURE - FLORAL DESIGNER

Other Titles: Floral Artist, Floral Arranger,
Florist, Designer, Design Coordinator.

Job Description:

A floral designer is a person trained in the art of flower arranging and the principles of design and color. The work consists of making floral pieces ranging from corsages to wedding bouquets; wreaths; sprays; funeral designs; birthdays; holidays; and other special occasions. A floral designer is creative and flexible. He or she must be capable of interpreting customer requests (either pictorial or verbal descriptions of the desired arrangement) and filling the customer's order. He or she should be able to identify and use all the appropriate flowers, tools, and supplies correctly as well as decide the kind and amount of materials needed to satisfy customer tastes and desires. In a small retail flower shop this person may also have sales and delivery duties as well.

Competencies Identified and Validated

N = 42*

Competencies	Weighted Mean**
1. Leadership and communication skills.	3.4
a. Write clearly and be able to interpret customer orders correctly.	3.8
b. Listen and speak effectively.	3.6
c. Present a clean, conscientious, and friendly appearance.	3.5
d. Conduct one's self in a considerate and concerned manner in social and business situations.	3.4
e. Handle complaints and problems with tact and understanding.	3.3
f. Plan and organize a work schedule.	3.1
g. Make decisions and evaluate results.	3.1
2. Business management skills.	3.4
a. Understand pricing policy and be able to make price/cost determinations.	3.6

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* Responses from 42 Floral Designers in 30 states. Survey conducted by Department of Agricultural Education, University of Rhode Island, Kingston, Rhode Island 02881.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b. Operate cash register, make change for sales transactions, and know how to process charge card sales. 3.5
c. Understand national and world wide floral delivery procedures. 3.4
d. Advise and recommend products and services to meet customer needs. 3.3
e. Keep accurate records. 3.2
f. Be familiar with delivery routes, time schedules, and delivery policies.#

3. Floriculture task-oriented skills. 3.5

a. Estimate cost of the arrangement. 3.7
b. Know the names of flowers and their seasonal availability. 3.6
c. Understand flower and foliage requirements for water, light, temperature, etc. 3.4
d. Be capable of preparation work such as hardening off preservation, wiring, etc. 3.4
e. Determine the kind and amount of flowers, foliage, and accessories needed to meet customer's tastes and desires. 3.4
f. Create all the basic floral designs (e.g., Hogarth curve, inverted T, L arrangements, etc.). 3.3
g. Be capable of making and executing plans for interior decoration schemes for weddings, dinners, parties, etc.#

Not included in questionnaire but recommended by some experts surveyed.

FLORICULTURE - GREENHOUSE FOREMAN

Other Titles: Grower, Crew Leader.

Job Description:

A greenhouse foreman is responsible for the proper care of all greenhouse facilities assigned to him in his area of the greenhouse range and understands the principles and practices of plant cultivation, propagation, and protection. He or she can identify the plants grown and their problems (diseases, pests, and others). Manages all greenhouse personnel under their direction; supervises their activities and trains them in the appropriate techniques for the crops being grown. He or she is often responsible for planning the cropping schedule for their section of the greenhouse range.

Competencies Identified and Validated

N = 19*

Competencies			Weighted Mean**
1.	Communication skills.		3.2
	a.	Plan and organize work schedules and keep accurate records.	3.6
	b.	Make decisions, evaluate results, earn respect, and promote harmony among workers.	3.5
	c.	Understand people and their problems and handle complaints with tact.	3.1
	d.	Exercise consideration and fairness with respect to job assignments and leadership.	3.1
	e.	Hire and train employees.	2.9
	f.	Present a clean, conscientious, and respectable appearance.	2.8
	g.	Accept direction from the manager.#	
2.	Floriculture (plant and soil science) task-oriented skills.		3.3
	a.	Identify and control insects, diseases, and other pests through correct application of pesticides.	3.8
	b.	Recognize requirements and deficiencies (environmental and nutritional) and correct through the use of greenhouse management practices (fertilizer, lime, water, etc.).	3.6

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* Responses from 19 Greenhouse Foremen in 19 states. Survey conducted by Department of Agricultural Education, University of Rhode Island, Kingston, Rhode Island 02881.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

# Not included in questionnaire but recommended by some experts surveyed.

c.	Perform and demonstrate planting, potting, transplanting, picking, pinching, and pruning techniques.	3.5
d.	Prepare soils properly for seeding, planting, or transplanting including soil sampling and testing; mixing, modifying, and conditioning with amendments.	3.4
e.	Know the names of all plants being grown and cultural requirements of the various plant species.	3.4
f.	Have a knowledge of agricultural and chemical regulations concerning pesticide use.	3.4
g.	Understand plant and soil science technology.	3.3
h.	Propagate plants by seeds, cuttings, etc.	3.2
i.	Cut, recondition, and harvest plants.	3.1
j.	Be commercially certified in pesticide application.	2.8
k.	Perform appropriate harvesting, grading, and packing of cut flowers and potted plants in preparation for marketing.#	
3.	Management and mechanical skills.	2.6
a.	Operate pesticide application equipment correctly and safely (e.g., fumigators, sprayers.).	3.3
b.	Maintain operation of heating, watering, lighting, ventilation, and air conditioning systems.	2.9
c.	Operate, maintain, and repair needed machinery (e.g., roto-tiller, tractor, concrete mixer, etc.).	2.3
d.	Be proficient in construction of utility buildings, etc.	1.8
e.	Plan and maintain all crop, operation and maintenance schedules.#	

# Not included in questionnaire but recommended by some experts surveyed.

FLORICULTURE - FLOWER SHOP MANAGER

Other Titles: Retail Florist.

Job Description:

The flower shop manager directs all operations and supervises personnel. He or she must be knowledgeable in business management, and be able to communicate effectively with the flower shop personnel. The manager must be able to plan and execute sales strategies, exert strong control of inventories, especially of fresh materials. He or she must also be able to plan a budget and operate within it. The ability to direct group efforts is essential.

Competencies Identified and Validated

N = 24*

		Competencies	Weighted Mean**
1.		Education and experience.	2.4
	a.	Knowledge of floriculture gained through "supervised" work experience in retail floriculture.	3.4
	b.	Informal training.	2.9
	c.	Formal training (secondary/post secondary school) in floriculture and business management.	2.4
	d.	Credits in floriculture/greenhouse management.	2.0
	e.	College degree.	1.4
2.		Leadership and communication skills.	3.6
	a.	Able to describe, discuss, and demonstrate tasks and responsibilities to employees effectively.	3.8
	b.	Be courteous, considerate, and respectful.	3.7
	c.	Understand customer/employee relations and promote a harmonious atmosphere.	3.7
	d.	Able to handle customer/employee needs and complaints tactfully.	3.7
	e.	Plan, organize, and direct work schedules.	3.6
	f.	Have a clean, neat appearance.	3.4
	g.	Possess effective "people" skills.	3.4
	h.	Speak clearly and effectively.	3.4

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* Responses from 24 Floriculture Shop Managers in 21 states. Survey conducted by Department of Agricultural Education, University of Rhode Island, Kingston, Rhode Island 02881.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Business management.	3.1
a.	Determine prices and pricing policy.	3.6
b.	Be able to buy and use flowers and supplies in such a way as to maintain a balanced inventory with small waste.	3.5
c.	Supervise sales and workroom operations.	3.5
d.	Keep accurate records and use credit properly.	3.4
e.	Capable of training employees.	3.4
f.	Understand and practice effective business procedures.	3.2
g.	Make job estimates accurately.	3.1
h.	Understand insurance and licensing regulations for local, state, and federal governments.	2.8
i.	Have experience in advertising and promotional sales techniques.	2.6
j.	Prepare tax returns, accounting and Social Security records, and understand bookkeeping.	2.3
4.	Floriculture.	2.8
a.	Capable of performing employee's tasks.	3.2
b.	Understand cultural requirements of plants.	2.9
c.	Know the names of all plants and plant materials sold by the shop, their propagation and culture.	2.9
d.	Know operation and techniques of greenhouse management including handling and storage of cut flowers and "greens".	2.6
e.	Understand operation of various greenhouse and shop machinery.	2.4
f.	Possess a high degree of floral design skill.#	

Not included in questionnaire but recommended by some experts surveyed.

GREENHOUSE WORKER

Other Titles: Greenhouse Employee, Laborer.

Job Description:

The Greenhouse Worker assists in growing plants in greenhouse operations. The greenhouse worker is involved with the planting, growth, and harvesting of greenhouse plants for sale directly to the public or to other retail outlets. The greenhouse worker may be involved with either vegetable or flower production. The specific duties performed by the greenhouse worker will depend on the type and size of greenhouse operation. In general, the greenhouse worker usually mixes and prepares the growing medium, sows seeds, starts cuttings, and transplants plants and seedlings; waters, thins, and weeds plants; controls insects and diseases; regulates the greenhouse environment, maintains tools and equipment, and cuts or harvests greenhouse plants.

Competencies Identified and Validated

N = 32*

Competencies		Weighted Mean**
1.	Perform general office work.	1.7
	a. Meet various people.	2.1
	b. Use telephone.	2.1
	c. File office forms and records.	1.3
	d. Schedule appointments.	1.1
2.	Record information.	2.9
	a. Record greenhouse crop production information.	3.1
	b. Record equipment maintenance information.	2.7
3.	Maintain facilities.	1.5
	a. Sweep work area floors.	1.5
4.	Follow safety practices in greenhouse production.	2.7
	a. Follow safe work habits.	3.7
	b. Identify potential safety hazards.	3.5
	c. Store chemicals.	3.5
	d. Interpret information on labels and signs.	3.5
	e. Dispose of chemical containers.	3.4
	f. Wear appropriate protective clothing.	3.3

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* Responses from 32 Greenhouse Workers in 20 states. Survey conducted by Program Director of Vocational Agriculture and Renewable Natural Resources Education, Division of Vocational-Technical Education, Old Capitol Building, Olympia, Washington 98504.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

g.	Ventilate work areas.	3.3
h.	Use proper lifting and carrying methods.	3.3
i.	Store inflammable materials.	3.2
j.	Remove debris from work areas.	3.2
k.	Use fire extinguishers.	3.1
l.	Wear appropriate work clothes.	3.1
m.	Adjust safety devices.	2.9
n.	Correct potential safety hazards.	2.7
o.	Use electrical connectors and safety devices.	2.7
p.	Install safety devices.	2.4
5.	Sell and market greenhouse plants.	2.0
a.	Label merchandise.	2.8
b.	Interpret plant care instructions.	2.7
c.	Complete sales slip.	2.6
d.	Describe items to customers.	2.6
e.	Greet customers.	2.5
f.	Determine whether specific plants requested by customers are in stock.	2.4
g.	Determine when merchandise is to be delivered.	2.3
h.	Receive customer orders by telephone.	2.3
i.	Close a sale.	2.2
j.	Make change.	2.1
k.	Price various items for customers.	2.1
l.	Handle customer complaints and objections.	2.1
m.	Identify seasonal items.	2.0
n.	Determine what customer is describing.	1.9
o.	Operate cash register.	1.9
p.	Make in-store sales contacts.	1.8
q.	Follow-up sales.	1.8
r.	Use billing machine.	1.3
s.	Use sales catalogs.	1.3
t.	Prepare advertisements.	1.0
6.	Store and warehouse greenhouse plants.	2.7
a.	Remove dead and diseased blooms and plant parts from storage.	3.3
b.	Use pot plant sleeving device to wrap potted plants.	2.7
c.	Rotate stock in storage areas.	2.8
d.	Use appropriate materials for packaging.	2.8
e.	Evaluate influence improper storage has on product quality.	2.7
f.	Box or crate large plants.	2.6
g.	Pack plants in fiberboard cartons.	2.5
h.	Place cut flowers in environmental storage.	2.4
i.	Pack cut flowers.	1.9
7.	Maintain greenhouse operations equipment and vehicles.	2.3
a.	Clean debris from equipment.	3.0
b.	Add oil to equipment.	2.8
c.	Inflate tires.	2.7

	d.	Grease equipment.	2.5
	e.	Interpret general maintenance instructions in equipment operator's manual.	2.3
	f.	Add coolant to radiators.	2.2
	g.	Change oil and oil filters.	2.2
	h.	Inspect cooling system on vehicles for leaks.	2.2
	i.	Install and adjust belts.	2.2
	j.	Remove equipment from storage.	2.1
	k.	Service air cleaners.	2.1
	l.	Install and service battery.	1.9
	m.	Prepare equipment for storage.	1.8
8.	Use and maintain hand and power tools.		2.9
	a.	Use hand tools safely.	3.4
	b.	Use power tools safely.	3.4
	c.	Clean tools.	3.0
	d.	Select tools for specific jobs.	3.0
	e.	Store tools.	3.0
	f.	Identify tools.	2.8
	g.	Interpret tool operation instructions.	2.8
	h.	Sharpen tools.	2.7
	i.	Adjust tools.	2.6
	j.	Recondition tools.	2.0
9.	Test soil and plant tissues.		2.0
	a.	Prepare soil to be submitted to testing laboratory.	2.3
	b.	Interpret soil test results.	2.2
	c.	Take representative soil samples.	2.2
	d.	Prepare forms to submit with soil samples.	2.0
	e.	Use parable kits to determine soil pH.	1.9
	f.	Prepare plant tissues to be submitted to testing laboratory.	1.8
	g.	Interpret plant tissue test results.	1.7
	h.	Prepare forms to submit with plant tissue.	1.7
10.	Fertilize plants in greenhouse operations.		2.7
	a.	Apply fertilizer in liquid form.	3.2
	b.	Interpret labels on fertilizer bags.	3.1
	c.	Use fertilizer injectors.	3.0
	d.	Interpret manufacturer's fertilization rate charts.	2.9
	e.	Apply dry fertilizer.	2.8
	f.	Mix fertilizer solutions.	2.8
	g.	Identify nutrient deficiency symptoms in growing plants.	2.8
	h.	Determine kind of fertilizer and lime to apply.	2.5
	i.	Determine when to apply fertilizer and pH adjustment materials.	2.5
	j.	Evaluate influence various nutrients have on plant growth.	2.5

	k.	Determine the nutrient requirements of various plants.	2.5
	l.	Determine amount of fertilizer and lime to apply.	2.4
	m.	Differentiate between organic and inorganic fertilizers.	2.3
	n.	Determine costs of fertilizers.	1.8
11.		Operate equipment and vehicles.	2.5
	a.	Use appropriate equipment and vehicles for specific jobs.	3.1
	b.	Interpret safety symbols on equipment.	3.0
	c.	Interpret gauge readings.	2.8
	d.	Refuel power units.	2.8
	e.	Correct potential equipment safety hazards.	2.7
	f.	Identify equipment safety hazards.	2.7
	g.	Interpret safety instructions in operator's manual.	2.7
	h.	Interpret hand operating signals.	2.5
	i.	Operate equipment and vehicles on public highways.	2.4
	j.	Adjust equipment safety shields.	2.4
	k.	Hitch towed equipment.	2.2
	l.	Operate equipment under work conditions.	2.2
	m.	Connect front end operated equipment.	1.9
	n.	Connect hydraulic systems and hydraulic operated equipment.	1.9
12.		Control insects and diseases in the greenhouse and field.	3.0
	a.	Use appropriate method to apply chemicals.	3.5
	b.	Mix chemicals with appropriate carrier.	3.4
	c.	Identify common insects.	3.4
	d.	Apply chemicals in liquid form.	3.3
	e.	Identify common diseases.	3.3
	f.	Identify damage caused by insects and diseases.	3.3
	g.	Select appropriate chemicals to control various insect pests and diseases.	3.3
	h.	Inspect greenhouse crops to determine when infestations require control.	3.3
	i.	Identify various means by which diseases and pests are spread.	3.1
	j.	Determine amount of chemical to apply.	3.0
	k.	Determine when to apply chemicals.	2.9
	l.	Apply chemicals in dust form.	2.9
	m.	Evaluate influence of diseases and pests on greenhouse productions.	2.8
	n.	Evaluate influence of temperature, light, and humidity on disease and insect problems.	2.8
	o.	Evaluate life cycle of insects to determine appropriate control procedures.	2.8
	p.	Apply chemicals in aerosol bombs.	2.7

q.	Identify disease and insect resistant varieties for planting.	2.4
r.	Apply chemicals through steam systems.	1.9
13.	Control weeds in the greenhouse and field.	2.7
a.	Mix chemicals.	3.2
b.	Use appropriate method to apply chemicals.	3.0
c.	Apply chemicals to control weeds.	3.0
d.	Inspect greenhouse crops to determine when weeds require control.	2.9
e.	Determine amount of chemical to apply.	2.8
f.	Determine when to apply chemical.	2.7
g.	Evaluate influence weeds have on greenhouse crops.	2.6
h.	Identify common weeds.	2.6
i.	Select appropriate method to control weeds.	2.6
j.	Use mechanical tools to remove weeds.	2.6
14.	Prepare the greenhouse growing medium.	2.7
a.	Fill benches and pots.	3.1
b.	Identify greenhouse soil materials.	3.1
c.	Fill soil bins.	3.0
d.	Mix soil with appropriate plant growing materials.	3.0
e.	Shred or screen soil.	2.8
f.	Steam soil.	2.8
g.	Determine appropriate soil mix for specific plants.	2.7
h.	Determine soil texture.	2.7
i.	Spread peat moss.	2.7
j.	Mark soil for planting.	2.6
k.	Level soil surface.	2.5
l.	Prepare compost.	2.4
m.	Sterilize and heat mixed soils with chemicals.	2.2
n.	Evaluate physical, chemical, and biological effects steam has on soil.	2.1
15.	Establish greenhouse plants.	2.4
a.	Water the soil.	3.4
b.	Determine proper planting depth.	3.3
c.	Use rooting hormones with cuttings.	3.2
d.	Mist cuttings.	3.1
e.	Prune plants.	3.1
f.	Identify problems related to propagation failures.	3.1
g.	Use appropriate planting method.	3.0
h.	Transplant seedlings.	3.0
i.	Grade cutting for size.	3.0
j.	Disbud plants.	3.0
k.	Determine soil temperatures.	2.9
l.	Force bulbs.	2.9
m.	Identify various plants.	2.9

n.	Place cuttings in flats.	2.9
o.	Remove cuttings from propagation benches.	2.9
p.	Determine air temperature.	2.8
q.	Determine proper time to plant.	2.8
r.	Make stem cuttings for appropriate plants.	2.8
s.	Place cuttings in rows.	2.8
t.	Tie plants.	2.8
u.	Determine planting rates for various varieties.	2.7
v.	Make leaf cuttings for appropriate plants.	2.7
w.	Pencil label planted specimens.	2.7
x.	Select cuttings and seeding stock.	2.7
y.	Determine number of cuttings to include in a pot.	2.6
z.	Interpret information on seed or bulb tags.	2.6
aa.	Select appropriate seeds and bulbs.	2.6
bb.	Cultivate beds.	2.5
cc.	Evaluate influence "poor" seed or bulb has on germination.	2.5
dd.	Sow seed for greenhouse stock.	2.5
ee.	Thin seedlings.	2.5
ff.	Determine percent germination.	2.3
gg.	Clean seeds.	2.1
hh.	Inoculate seeds.	1.7
ii.	Make an approach graft.	1.4
jj.	Graft cacti.	1.1
kk.	Make a bark graft.	1.1
ll.	Make a machine graft.	1.1
mm.	Make a patch-bud graft.	1.1
nn.	Make a saddle graft.	1.1
oo.	Make a splice graft.	1.1
pp.	Make a T-bud graft.	1.1
qq.	Make a whip-and-tongue graft.	1.1
16.	Construct and maintain greenhouse buildings and structures.	2.3
a.	Replace window panes.	2.8
b.	Replace plastic covering on temporary greenhouses.	2.8
c.	Apply wood and metal preservatives.	2.7
d.	Replace belts and pulleys.	2.6
e.	Reset circuit breakers.	2.6
f.	Replace fuses.	2.6
g.	Replace valves in water lines.	2.6
h.	Replace or repair water faucets.	2.6
i.	Wash greenhouse glass.	2.6
j.	Construct and repair benches and frames.	2.6
k.	Clean heating and cooling systems.	2.5
l.	Replace water pipes.	2.5
m.	Clean and oil electric motors.	2.4
n.	Repair minor leaks in roof of buildings.	2.4
o.	Replace lighting fixtures.	2.4
p.	Replace traps in heating system and water line.	2.3

q.	Replace electrical switches.	2.2
r.	Repair electrical cords and wires.	2.2
s.	Wire simple electrical circuit.	2.1
t.	Install electrical motors.	2.0
u.	Construct and remove concrete forms.	1.9
v.	Hang and repair doors.	1.9
w.	Develop bill of materials needed for repairs.	1.8
x.	Pour, finish, and cure concrete.	1.8
y.	Repair bracing in buildings.	1.8
z.	Determine cost of repairs needed.	1.7
aa.	Lay concrete block.	1.6
bb.	Make minor repairs on metal quonset superstructure.	1.6
cc.	Read and interpret blueprints.	1.6
17.	Assemble and install greenhouse equipment and structures.	2.8
a.	Water greenhouse plants.	3.7
b.	Control air temperature.	3.1
c.	Control humidity.	3.1
d.	Alter spacing of plants.	3.0
e.	Apply shading compound to glass.	3.0
f.	Control light quantity and quality.	3.0
g.	Mist plants.	3.0
h.	Evaluate affect temperature has on plants.	2.9
i.	Determine appropriate temperatures for various plants.	2.9
j.	Evaluate influence relative humidity has on plant growth.	2.8
k.	Hand cloth or saran cloth.	2.8
l.	Set automatic water timers.	2.8
m.	Wet greenhouse walks.	2.8
n.	Interpret light meters.	2.5
o.	Basin plants for watering.	2.4
p.	Temper water.	2.2
q.	Regulate carbon dioxide generating equipment.	2.1
18.	Harvest greenhouse plants.	2.9
a.	Determine when various plants should be cut or removed.	3.4
b.	Grade plants as to quality and uniformity.	3.3
c.	Observe plants to determine stages of bloom.	3.2
d.	Evaluate the influence stage of maturity has on quality and value of plant.	3.1
e.	Assemble orders.	3.1
f.	Weed and tag plant materials for orders.	3.0
g.	Label harvested plants by common name.	2.9
h.	Load materials into cars or trucks.	2.8
i.	Determine whether various flower plants are to be marketed as pots, baskets, or as individual flowers.	2.8
j.	Dig plant materials.	2.1
k.	Ball plant materials.	2.0

GROUNDS SUPERVISOR

Job Description:

Grounds Supervisors are responsible to the grounds superintendent for maintenance and upkeep of grounds surrounding structures of an industry or business, school, hospital, private estate, municipal park, airport, cemetery, or any other enterprise or establishment with a sizable amount of grounds to care for. They organize and direct the work of "grounds workers" of "assistant groundskeepers" and maintain records and prepare reports concerning maintenance activities. They must be capable of translating blueprints and plans prepared by the landscape architect into reality, and may develop and carry out landscape plans of their own. They must know cultural requirements of all types of plant material; be capable of operating and maintaining groundskeeping equipment; and be able to design, construct, and maintain concrete, wood, and metal landscape structures and conveniences. Post-high school technical training is generally required for entry into the position.

Competencies Identified and Validated

N = 36*

Competencies	Weighted Mean**
1. Organize jobs and supervise workers.	3.3
a. Demonstrate and instruct employees in their tasks.	3.7
b. Enforce safety regulations.	3.5
c. Prepare daily work plans.	3.3
d. Evaluate performance of workers.	3.1
e. Confer with workers concerning problems and performance.	3.1
f. Acquire equipment and plant materials.	2.8
2. Maintain records and make reports.	3.1
3. Read blueprints and plans.	2.9
4. Prepare planting schedules.	2.6
5. Establish, renovate, and maintain turf and lawns.	2.9
a. Determine mowing schedules.	3.3
b. Determine watering rates and schedules.	3.2

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* Responses from 36 Grounds Maintenance Personnel in 23 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26505.

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	c.	Identify weeds, insects, and diseases in turf.	3.0
	d.	Control weeds, insects, and diseases in turf and lawns.	2.9
	e.	Select and apply fertilizers and lime according to soil requirements.	2.9
	f.	Take soil samples for testing.	2.9
	g.	Determine seedbed preparation methods.	2.8
	h.	Control erosion on newly planted area.	2.8
	i.	Grade lawns.	2.7
	j.	Determine planting method (sodding, sprigging, and/or seeding).	2.7
	k.	Identify and select grasses.	2.6
6.	Plant and maintain ornamental plantings.		2.6
	a.	Identify various landscape plants.	3.1
	b.	Recognize environmental requirements of trees, shrubs, flowers, vines, and other plant materials.	3.1
	c.	Protect plants from insects, diseases, and rodent damage.	3.0
	d.	Determine watering rates and schedules.	2.9
	e.	Select and apply fertilizers and soil amendments.	2.9
	f.	Trim and prune trees and shrubs.	2.9
	g.	Cultivate and mulch.	2.8
	h.	Determine spacing and depth of planting.	2.7
	i.	Transplant ball and burlap plants.	2.7
	j.	Prepare planting area.	2.7
	k.	Determine planting dates.	2.6
	l.	Brace and repair trees.	2.6
	m.	Transplant bare root plants.	2.5
	n.	Dig and plant bulbs.	2.4
	o.	Provide winter protection.	2.3
	p.	Train espalier trees and shrubs.	2.1
	q.	Propagate plants by cuttings, layering, and division.	1.5
	r.	Plant seeds.	1.5
7.	Select, use, and maintain hand tools and equipment.		3.3
8.	Operate and maintain power-operated grounds maintenance equipment.		2.4
	a.	Operate, adjust, and service fertilizer spreaders.	3.0
	b.	Operate, adjust, and service sprayers.	2.9
	c.	Operate, adjust, and service tillers and cultivators.	2.8
	d.	Operate, adjust, and service seeders.	2.8
	e.	Operate, adjust, and service garden tractors.	2.7
	f.	Operate, adjust, and service lawn sweeps.	2.7
	g.	Operate, adjust, and service lawn mowers.	2.7
	h.	Operate, adjust, and service hedge shears.	2.6

	i. Operate, adjust, and service tractors.	2.6
	j. Operate, adjust, and service chain saws.	2.4
	k. Operate, adjust, and service dusters.	2.3
	l. Operate, adjust, and service leaf collectors.	2.0
	m. Operate, adjust, and service trucks.	2.0
	n. Operate, adjust, and service back hoes.	1.8
	o. Operate, adjust, and service spreader equipment for chemical snow removal.	1.6
	p. Operate, adjust, and service cherry pickers.	1.4
9.	Construct, maintain, and/or install landscape items.	2.4
	a. Install drainage systems.	2.6
	b. Construct and maintain fences.	2.5
	c. Construct and maintain steps, walks, and drives.	2.5
	d. Construct and maintain terraces and patios.	2.5
	e. Construct and maintain retaining and free-standing walls.	2.4
	f. Construct and maintain benches and garden furniture.	2.4
	g. Install irrigation systems.	2.4
	h. Construct and maintain garden pools and streams.	2.3
	i. Install steel or wood curbing.	2.0
	j. Install sculpture, statuary, and fountains.	1.7

CREW FOREMAN - LANDSCAPE PLANTER

Job Description:

Crew Foremen are responsible for supervising crews of landscape workers efficiently and in harmony. They must be able to translate blueprints prepared by the landscape architect or planner into a workable site layout and plan. They must know and be able to teach their crew members grading techniques, soil preparation procedures, and planting methods for trees, shrubs, vines, flowers, and grasses. Supervising layout and construction of sidewalks, driveways, fountains, patios, and formal garden plans may also be part of their job. To become a crew foreman, completion of a post-high school technical course or several years of on-the-job training will probably be required.

Competencies Identified and Validated

N = 29*

Competencies		Weighted Mean**
1.	Organize jobs and supervise workers.	3.1
	a. Demonstrate and instruct employees in their tasks.	3.7
	b. Confer with management regarding workers, work conditions, and plans.	3.5
	c. Prepare daily work plans.	3.1
	d. Confer with workers regarding problems and performance.	3.0
	e. Evaluate performance of workers.	3.0
	f. Acquire equipment and plant materials.	2.5
2.	Maintain records and make reports.	3.4
3.	Analyze and prepare the landscape area.	2.5
	a. Read blueprints and plans.	3.5
	b. Lay out the landscape plan.	3.2
	c. Survey and grade the site.	2.4
	d. Install drainage systems.	2.3
	e. Develop a working site plan.	2.0
	f. Determine drainage needs.	2.0
	g. Install irrigation systems.	1.4
4.	Plant trees, shrubs, groundcovers, and flowers.	2.6

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* Responses from 29 Landscape Contractors in 17 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a.	Identify various landscape plants.	3.4
	b.	Prepare planting site.	3.4
	c.	Plant ball and burlap and container grown stock.	3.3
	d.	Prune and trim newly planted trees and shrubs.	3.3
	e.	Determine spacing and depth of planting.	3.0
	f.	Plant bare root plants.	3.0
	g.	Select and apply mulching materials.	2.9
	h.	Determine methods and techniques of supporting plants.	2.5
	i.	Plant seeds and bulbs.	2.4
	j.	Determine fertilizer and soil amendment types and rates of application.	2.0
	k.	Determine watering schedules and rates.	1.9
	l.	Determine planting dates.	1.9
	m.	Plant cuttings.	1.8
	n.	Protect plants from rodent damage.	1.4
5.	Establish and renovate turf and lawns.		1.7
	a.	Determine soil preparation methods.	2.2
	b.	Determine planting methods.	2.0
	c.	Identify and select grasses.	1.7
	d.	Determine seeding and springing rates and methods.	1.7
	e.	Determine methods of rolling areas planted by seeding, stolons, and sodding.	1.7
	f.	Determine watering rates and schedules.	1.7
	g.	Determine erosion control needs and methods.	1.6
	h.	Determine type and amount of mulching required.	1.6
	i.	Sterilize soil to eliminate pests.	1.6
	j.	Determine planting dates.	1.5
	k.	Determine fertilizer, lime, and soil amendment types, rates, and method of application.	1.5
	l.	Collect soil samples and interpret test results.	1.0
6.	Layout and construct or install landscape structures and conveniences.		2.3
	a.	Layout and construct walks, drives, and patios.	2.5
	b.	Layout and build retaining and free standing walls.	2.4
	c.	Layout and construct steps and ramps.	2.3
	d.	Layout and construct fences.	2.2
	e.	Layout and install fountains and pools.	2.1
	f.	Construct benches and garden furniture.	2.0

GROUNDS WORKER

Other Titles: Assistant Groundskeeper.

Job Description:

Grounds Workers work under the direction of grounds supervisors in caring for the area surrounding structures of an industry or business, school, hospital, private estate, cemetery, municipal park, airport, or any other enterprise or establishment with a sizable amount of grounds to care for. They plant and care for turf, groundcover, shrubs and trees, as well as for annuals and perennials. They operate, maintain, and service hand and power operated groundskeeping equipment. Year-round employment is provided through construction, maintenance, and repair of walks, drives, equipment, and conveniences. Completion of a high school education with training in ornamental horticulture is highly desirable for entry into this job.

Competencies Identified and Validated

N = 38*

Competencies		Weighted Mean**
1.	Establish, renovate, and care for turf and lawns.	2.9
a.	Plant grasses by sodding, sprigging, and/or seeding.	3.5
b.	Mow lawns.	3.5
c.	Apply lime and fertilizer to lawns.	3.2
d.	Prepare seedbeds.	3.1
e.	Water lawns.	3.0
f.	Mulch planted areas.	2.9
g.	Grade, rake, and level lawns.	2.9
h.	Aerate lawns.	2.8
i.	Recognize common lawn weeds, insects, and diseases.	2.7
j.	Spray lawns for weed, insect, and disease control.	2.7
k.	Roll newly sodded areas.	2.7
l.	Identify lawn grasses.	2.3
m.	Take soil samples for testing.	2.3
2.	Plant and care for ornamental plantings.	2.8
a.	Transplant ball and burlap plants.	3.1
b.	Control weeds in plantings.	3.1

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* Responses from 38 Grounds Maintenance Personnel in 20 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	c.	Water ornamental plants.	3.1
	d.	Trim and prune trees and shrubs.	3.1
	e.	Prepare planting area.	3.0
	f.	Cultivate and mulch.	3.0
	g.	Protect plants from insect, disease, and rodent damage.	3.0
	h.	Transplant bare root plants.	2.9
	i.	Recognize environmental requirements of trees, shrubs, flowers, vines, and other plant materials.	2.7
	j.	Apply fertilizer and soil amendments.	2.7
	k.	Dig and plant bulbs.	2.6
	l.	Provide winter protection.	2.6
	m.	Plant seeds.	2.5
	n.	Brace and repair trees.	2.4
	o.	Train espalier trees and shrubs.	2.0
	p.	Propagate plants by cuttings, layering, and division.	2.0
3.		Use and maintain hand tools and equipment.	3.5
4.		Operate, service, and repair power-operated grounds maintenance equipment.	2.5
	a.	Operate, adjust, and service lawn mowers and edgers.	3.3
	b.	Operate, adjust, and service hedge shears.	3.0
	c.	Operate, adjust, and service fertilizer spreaders.	3.0
	d.	Operate, adjust, and service tillers and cultivators.	2.9
	e.	Operate, adjust, and service sprayers.	2.9
	f.	Operate, adjust, and service garden tractors.	2.8
	g.	Operate, adjust, and service tractors.	2.8
	h.	Operate, adjust, and service seeders.	2.7
	i.	Operate, adjust, and service chain saws.	2.7
	j.	Operate, adjust, and service dusters.	2.5
	k.	Operate, adjust, and service lawn sweeps.	2.4
	l.	Operate, adjust, and service trucks.	2.3
	m.	Operate, adjust, and service snow plows and blowers.	2.2
	n.	Operate, adjust, and service leaf collectors.	2.0
	o.	Operate, adjust, and service spreader equipment for chemical snow removal.	1.8
	p.	Operate, adjust, and service backhoes.	1.7
	q.	Operate, adjust, and service cherry pickers.	1.3
5.		Construct, maintain, and repair and/or install landscape items.	2.0
	a.	Keep worksite neat.	3.6
	b.	Construct and/or repair fences.	2.4
	c.	Install, maintain, and repair drainage systems.	2.3

d.	Install, maintain, and repair irrigation systems.	2.3
e.	Paint landscape structures.	2.2
f.	Mix mortar.	1.8
g.	Build forms for concrete.	1.7
h.	Lay concrete block, stone, and/or brick.	1.7
i.	Place and repair asphalt.	1.7
j.	Mix, place, finish, and cure concrete.	1.6
k.	Install sculpture, statuary, and fountains.	1.5
l.	Build benches and garden furniture.	1.5

LANDSCAPE AIDE

Other Titles: Landscape Worker.

Job Description:

Landscape Aides work under the supervision of crew foremen in establishing a landscape plan. They may assist in grading the site and installing drainage systems, prepare soil for planting, and plant trees, shrubs, grass, and other plant materials, using manual and power operated equipment. They may help construct walks, driveways, pools, and other landscape structures. To enter the job of Landscape Aide, extensive laboratory or field experience in a high school vocational agriculture program of ornamental horticulture will be helpful.

Competencies Identified and Validated

N = 24*

Competencies			Weighted Mean**
1.	Prepare landscape area.		2.6
	a.	Grade landscape site.	3.3
	b.	Cut and remove trees and shrubs.	2.7
	c.	Remove rocks and debris.	2.6
	d.	Install drain tile.	2.2
	e.	Install irrigation system.	1.9
2.	Plant trees, shrubs, groundcovers, and flowers.		3.1
	a.	Prepare holes for transplanting trees and shrubs.	3.7
	b.	Apply fertilizer and soil amendments.	3.5
	c.	Plant, ball, and burlap plants.	3.5
	d.	Wrap and stake trees.	3.5
	e.	Prune and trim newly planted trees and shrubs.	3.4
	f.	Apply mulching materials.	3.3
	g.	Water plants and beds.	3.3
	h.	Plant bare root plants.	3.0
	i.	Prune roots of bare root plants.	2.9
	j.	Prepare seedbeds for seeds, bulbs, and cuttings.	2.7
	k.	Plant seed and bulbs.	2.6
	l.	Plant cuttings.	2.0
3.	Plant and renovate turf and lawn area.		2.8
	a.	Lay sod.	3.2
	b.	Incorporate starter fertilizers.	3.1
	c.	Plant seed.	3.1

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* Responses from 24 Landscape Contractors in 16 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26505.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	d.	Prepare the seedbed by tillage.	2.9
	e.	Apply lime and fertilizers.	2.9
	f.	Water lawn area.	2.9
	g.	Roll lawn area.	2.8
	h.	Mulch planted area.	2.8
	i.	Sterilize soil.	2.0
	j.	Plant stolons (spriggs).	1.7
4.	Construct landscape structures and conveniences.		1.6
	a.	Build forms for concrete.	1.8
	b.	Lay concrete block, stone, and/or brick.	1.8
	c.	Install fountains and pools.	1.8
	d.	Construct fences.	1.7
	e.	Mix, place, finish, and cure concrete.	1.7
	f.	Mix mortar.	1.6
	g.	Build benches and lawn furniture.	1.4
	h.	Paint landscape structures.	1.3
5.	Operate, adjust, and service equipment.		2.6
	a.	Operate and service trucks.	3.1
	b.	Operate, adjust, and service tillers and cultivators.	3.1
	c.	Operate, adjust, and service garden tractors.	2.9
	d.	Operate, adjust, and service chain saws.	2.8
	e.	Operate, adjust, and service large tractors.	2.7
	f.	Operate, adjust, and service seed and fertilizer distributors.	2.7
	g.	Operate, adjust, and service loaders.	2.4
	h.	Operate, adjust, and service levelling blades.	2.2
	i.	Operate and service lawn rollers.	2.2
	j.	Operate, adjust, and service back hoes.	2.0

RETAIL LANDSCAPE AND GARDEN CENTER SALESPERSON

Job Description:

The Retail Landscape and Garden Center Salesperson has knowledge of both horticultural and business skills. The salesperson possesses desirable personal qualities which enable him/her to effectively represent the business and to successfully complete business transactions. The Salesperson understands the culture of various horticultural crops which may be used by the home gardener. In addition, the employee cares for and maintains plant materials which are marketed in the garden center.

Competencies Identified and Validated

N = 32*

Competencies	Weighted Mean**
1. Personal qualities and qualifications.	3.2
a. Demonstrate the desire to work.	3.5
b. Demonstrate the ability to get along with others.	3.4
c. Demonstrate the ability to project a desirable image for the business.	3.4
d. Maintain a satisfactory attendance record.	3.4
e. Demonstrate a willingness to learn.	3.4
f. Demonstrate the ability to work independently.	3.2
g. Demonstrate the ability to follow directions of supervisor.	3.2
h. Demonstrate acceptable personal appearance and personal hygiene.	3.1
i. Understand needs of customers.	3.1
j. Demonstrate attitudes of customers and discuss with supervisor when necessary.	2.8
2. Merchandising and selling skills.	2.4
a. Approach customer.	3.2
b. Provide information and answers.	3.2
c. Determine needs of customer.	3.1
d. Operate sales equipment (cash register, calculator, charge equipment, receipts).	3.0

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* Responses from 32 Garden Center Sales Persons and Managers in 24 states. Survey conducted by the Department of Agricultural and Extension Education, Department of Horticulture, University of Maryland, College Park, Maryland 20742.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

e.	Set up new materials on shelves in greenhouse or nursery for sale.	2.7
f.	Package and/or wrap merchandise for customers.	2.7
g.	Receive and unpack shipments of new materials.	2.5
h.	Develop displays.	2.2
i.	Demonstrate desirable telephone skills.	2.2
j.	Complete arrangements for financing.	2.0
k.	Label materials with information concerning care and price.	2.0
l.	Make inventory of stock.	1.8
m.	Make delivery arrangements.	1.2
3.	Culture of fruits for the home garden.	2.9
a.	Recommend type of fertilizer.	3.0
b.	Diagnose insect and disease problems.	3.0
c.	Recommend control for insect and disease problems.	3.0
d.	Identify and be familiar with the care and culture of fruit crops grown locally.	2.8
e.	Recommend time of year in which pruning should be done.	2.7
f.	Recommend rates needed for fruit crops.	2.6
g.	Recommend application time.	2.5
h.	Describe purpose of pruning.	2.5
i.	Describe specific pruning techniques including type of cuts to be made and location on plant.	2.5
j.	Advise customer of federal laws concerning pesticide use.	2.5
k.	Plant various specimens.	2.5
l.	Recommend layout of plants for the home fruit garden.	2.3
m.	Recommend soil preparation techniques.	2.0
4.	Culture of ornamentals for the home garden.	2.8
a.	Identify and be familiar with the care and culture of trees, shrubs, and vines grown locally.	3.5
b.	Recommend watering techniques.	3.2
c.	Identify and be familiar with the care and culture of bedding plants grown locally.	3.1
d.	Recommend planting practices.	3.1
e.	Recommend types of fertilizer needed for various plants.	3.0
f.	Diagnose insect and disease problems.	3.0
g.	Recommend control for insect and disease problems.	2.9
h.	Recommend timing of fertilizer applications.	2.9

i.	Identify and be familiar with the care and culture of foliage plants.	2.9
j.	Recommend application rates for fertilizers.	2.8
k.	Recommend cultural practices for interior gardening, such as watering and fertilizing.	2.7
l.	Recommend timing of pruning practices.	2.7
m.	Describe purpose of various types of pruning.	2.6
n.	Advise consumer of federal laws concerning pesticide use.	2.4
o.	Describe specific pruning techniques including type of cuts to be made and location on plant.	2.4
p.	Recommend desirable environmental conditions needed for interior gardening.	2.2
q.	Recommend liming procedures.	2.2
r.	Identify and be familiar with the care and culture of specialty greenhouse crops, such as poinsettias and lilies.	2.2
5.	Culture of vegetables for the home graden.	2.7
a.	Identify and be familiar with the care and culture of vegetable crops grown locally.	2.9
b.	Recommend varieties suitable for the particular location.	2.8
c.	Recommend types of fertilizers needed for vegetable crops.	2.8
d.	Recommend planting procedures.	2.8
e.	Recommend watering practices.	2.8
f.	Diagnose insect and disease problems.	2.8
g.	Prescribe control for insect and disease problems.	2.8
h.	Recommend application rates for fertilizers.	2.7
i.	Recommend timing of fertilizer applicators.	2.7
j.	Describe use of soil additives such as manure.	2.7
k.	Recommend weed control practices.	2.4
l.	Advise consumer of federal laws concerning the use of pesticides.	2.4
m.	Recommend liming practices.	2.3
6.	Turf practices for the home gardener.	2.8
a.	Recommend type of fertilizer to be used for turf.	3.0
b.	Recommend application time.	2.9
c.	Recommend rate of application.	2.9
d.	Recommend weed control program.	2.9
e.	Recommend control for insect and disease problems.	2.9

f.	Describe seeding procedures.	2.9
g.	Diagnose insect and disease problems.	2.8
h.	Identify and be familiar with turf types grown locally.	2.8
i.	Describe purpose and use of soil conditioners.	2.7
j.	Advise consumer of federal laws concerning the use of pesticides.	2.4
k.	Recommend liming practices.	2.3
l.	Describe sodding techniques.	2.3
m.	Describe plugging procedures.	1.9
7.	Garden shop maintenance skills.	2.7
a.	Follow safety recommendations when applying chemicals.	3.2
b.	Water plant material with hose.	3.1
c.	Apply fertilizer to greenhouse material.	2.9
d.	Diagnose insect problems.	2.9
e.	Diagnose disease problems caused by bacteria, fungi, etc.	2.8
f.	Diagnose disease problems or damage caused by poor environmental conditions.	2.8
g.	Prescribe control for insect and disease problems.	2.8
h.	Apply fertilizer to nursery material.	2.8
i.	Report greenhouse plant material.	2.8
j.	Prune and shape nursery material.	2.7
k.	Provide winter protection for nursery material.	2.7
l.	Containerize nursery material.	2.6
m.	Prepare soil mixes.	2.5
n.	Prune and shape greenhouse crops.	2.4
o.	Apply pesticides in greenhouse and nursery.	2.4
p.	Operate automatic watering system.	2.2
q.	Sterilize soil mixes.	2.0

NURSERY WORKER

Job Description:

Nursery Workers grow seedlings and plants for landscaping, fruit farming, and forest replanting. They work under the supervision of nursery foremen and must know plant materials and cultural techniques. They need to know how to operate and maintain special equipment such as mowers, tillers, tractors, diggers, and hand tools used in the nursery business. A Nursery Worker prepares seedbeds, plants seedlings, prepares cuttings for rooting, weeds, cultivates, waters, prunes, and may perform other cultural practices, such as spraying, fertilizing, mulching, and grafting. They may dig and pack plants for shipment, and may transplant trees and shrubs. They may also help with construction, maintenance, and repair of buildings and equipment.

Competencies Identified and Validated

N = 34*

Competencies	Weighted Mean**
1. Prepare growing mediums and seedbeds.	2.5
a. Apply chemicals to control weeds and/or soil insects.	3.0
b. Dig holes for trees and shrubs (hand and power equipment).	2.7
c. Operate tillage machinery.	2.6
d. Mix and sterilize greenhouse and coldframe mediums.	2.5
e. Haul and spread peat moss and other plant materials.	2.3
f. Operate lime and/or fertilizer spreaders.	2.2
g. Lay out space requirements for various varieties.	2.2
h. Take soil samples.	2.0
2. Propagate nursery stock.	2.7
a. Prepare cuttings.	3.0
b. Transplant seedlings and cuttings to the field.	3.0
c. Clean, treat, and plant seed.	2.7
d. Start and care for container stock.	2.7
e. Label planted rows or areas.	2.5
f. Bud and graft nursery stock.	2.4
3. Culture plants in the nursery.	2.8

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* Responses from 34 Nursery Operators in 25 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26505.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a.	Water nursery stock.	3.4
	b.	Prune and trim plants.	3.2
	c.	Prepare cuttings.	3.1
	d.	Operate sprayers and dusters.	3.0
	e.	Thin and space nursery stock.	3.0
	f.	Identify and remove diseased and dead plants.	3.0
	g.	Identify common weeds, insects, and diseases.	2.9
	h.	Cultivate with hand and power equipment.	2.8
	i.	Mulch nursery stock.	2.3
	j.	Lay plastic for weed control.	2.0
	k.	Set traps and poisons for pests.	1.9
4.	Harvest nursery stock.		2.7
	a.	Dig stock with hand and power equipment.	3.3
	b.	Ball and burlap stock.	3.0
	c.	Label harvested plants.	3.0
	d.	Pot plants for retail sale.	2.3
	e.	Harvest and clean seed.	2.0
5.	Store nursery stock.		2.2
	a.	Remove dead or inferior plants.	2.5
	b.	Maintain humidity and temperature requirements.	2.4
	c.	Care for over-wintering of container stock.	2.2
	d.	Label storage bins and bags.	2.1
	e.	Bunch and pack plants.	2.0
	f.	Deliver plants to warehouse.	1.7
6.	Process and ship nursery stock.		2.3
	a.	Package orders for shipment.	2.5
	b.	Prepare shipping labels and invoices.	2.3
	c.	Deliver plant materials to wholesalers and/or retailers.	2.1
7.	Maintain buildings and equipment.		2.2
	a.	Keep work, storage, and delivery areas neat and clean.	3.2
	b.	Clean and sharpen hand tools.	3.0
	c.	Maintain and service business vehicles and/or tractors.	2.8
	d.	Maintain and service power tillers, mowers and cultivators.	2.8
	e.	Maintain and service tractor operated equipment.	2.7
	f.	Maintain and install sprinkler heads, pipe nozzles and other irrigation equipment.	2.5
	g.	Clean, adjust, and service dusters, and sprayers.	2.4
	h.	Maintain and adjust small gas engines.	2.1
	i.	Repair storage buildings, bins and equipment (carpentry).	1.9
	j.	Maintain and service water valves, spigots, and pumps.	1.8
	k.	Paint nursery house and storage buildings.	1.7
	l.	Clean and oil electric motors.	1.6
	m.	Service heating pots and boilers.	1.5

n.	Install and repair light switches, receptacles, and extension cords.	1.3
o.	Mix, place, and finish concrete.	1.2

PLANT PROPAGATOR

Job Description:

Plant Propagators are responsible to nursery superintendents or the nurserymen. They start new plants from seeds, cuttings, grafting, or other means. They may have several foremen and/or a number of workers in their charge. They must know the cultural techniques of propagating various kinds of woody and herbaceous plants; be capable of managing greenhouses, hotbeds and outdoor seed beds; and have a thorough knowledge of insect and disease control. They must also plan propagation schedules and be able to identify plants readily. The Plant Propagator has generally received training beyond the high school level.

Competencies Identified and Validated

N = 24*

Competencies	Weighted Mean**
1. Plan propagation schedules.	3.2
2. Prepare planting media.	2.7
a. Determine outdoor seedbed preparation techniques.	3.0
b. Lay out space requirements for various varieties.	2.9
c. Determine soil mix for specific plant requirements.	2.9
d. Determine fertilizer requirements.	2.9
e. Determine chemicals to use in control of weeds, diseases, and/or soil insects.	2.9
f. Sterilize soil, media, and/or containers.	2.7
g. Determine bed arrangements.	2.7
h. Select nursery planting site.	2.3
i. Test soil for N.P.K. and soluable salts.	2.1
3. Propagate by seed.	2.8
a. Plant seed.	3.1
b. Label planted rows or areas.	3.1
c. Water seedlings.	3.0
d. Identify seeds.	2.9
e. Fertilize seedlings.	2.9
f. Transplant seedlings to pots or field.	2.8
g. Select sources of seed.	2.7
h. Treat seed.	2.7
i. Select and use tools, materials, containers, and equipment used in seedage.	2.5

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* Responses from 24 Nursery Operators in 21 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

j.	Thin seedlings.	2.4
k.	Harvest, extract, clean, dry, and store seed.	2.3
4.	Propagate by vegetative means.	2.9
a.	Select and collect plant materials for reproduction.	3.4
b.	Prepare stem, leaf, and/or root cuttings.	3.2
c.	Label rows or areas.	3.1
d.	Select and use tools, equipment, waxes, hormones, and other materials used in vegetative reproduction.	3.0
e.	Bud and/or graft scions (cions) to seedling stock.	2.8
f.	Transplant to pots or field.	2.5
g.	Propagate plants by division and/or separation.	2.4
h.	Reproduce plants by layering.	2.3
5.	Control plant environment.	3.0
a.	Determine water requirements and schedule.	3.5
b.	Control temperature and humidity levels in the greenhouse.	3.2
c.	Determine spacing of plants.	3.1
d.	Determine fertilizer types and rates of application.	3.0
e.	Select, install, and operate mist system propagation benches.	2.9
f.	Select weed, disease, and insect control measures.	2.7
g.	Construct and use hotbeds and coldframes.	2.6

NURSERY MECHANIC

Job Description:

Nursery Mechanics are responsible for maintaining mechanical equipment and structures. They service and repair vehicles, power units, and machinery used in the nursery business and may fabricate, maintain, and repair metal, wood, and concrete structures and equipment. They may install and maintain electrical wiring and equipment, water and steam pipes, and irrigation devices. Their job requires extensive knowledge of the care and use of hand and power tools.

Competencies Identified and Validated

N = 21*

Competencies	Weighted Mean**
1. Maintain tractors, trucks, fork lifts, and business vehicles.	3.3
a. Service lubrication systems.	3.5
b. Service air intake and carburation systems.	3.4
c. Service hydraulic systems.	3.4
d. Maintain tires.	3.4
e. Service cooling systems.	3.3
f. Service electrical and ignition systems.	3.1
2. Maintain small-engine operated equipment.	3.0
a. Service and repair small-engine operated sprayers and dusters.	3.2
b. Service, repair, and adjust power tillers and cultivators.	3.1
c. Adjust, repair, and sharpen chain saws.	2.9
d. Service air compressors and pneumatic powered equipment.	2.8
e. Service, repair, and adjust turf and lawn cutting equipment.	2.8
f. Service and repair small-engine operated fertilizer and seed spreaders.	2.8
3. Clean, adjust, and repair small gasoline engines.	3.8
4. Maintain tractor-operated field equipment.	3.2
a. Adjust, repair, and service fertilizing equipment.	3.3
b. Adjust, repair, and service planting equipment.	3.2

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* Responses from 21 Nursery Operators in 17 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia, 26506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	c.	Adjust, repair, and service spraying equipment.	3.2
	d.	Adjust, repair, and service tillage equipment.	3.2
	e.	Adjust, repair, and service cultivation equipment.	3.2
5.		Repair and construct special nursery items.	2.3
	a.	Arc weld metal structures.	2.7
	b.	Braze, cut, and weld with oxyacetylene equipment.	2.7
	c.	Repair and build wooden frames, benches, and other nursery structures.	2.6
	d.	Mix, place, and finish concrete.	2.1
	e.	Install and glaze glass.	2.1
	f.	Figure bills of materials.	1.9
	g.	Lay brick and concrete block.	1.8
6.		Use and maintain hand tools and portable power equipment.	3.2
7.		Install and maintain electrical systems.	2.4
	a.	Replace fuses.	2.6
	b.	Clean and oil electric motors.	2.5
	c.	Install and replace switches, receptacles, and other electrical devices.	2.4
	d.	Install electrical wiring.	2.1
8.		Install and maintain plumbing systems.	2.2
	a.	Maintain water delivery devices for greenhouse and outdoor irrigation systems.	2.7
	b.	Select and install copper, steel, and plastic pipe and fittings.	2.2
	c.	Maintain steam generators.	2.0
	d.	Replace fuses.	2.0
9.		Keep work and storage areas in the nursery maintenance shop clean and orderly.	3.7
10.		Observe safety rules and regulations.	3.9

NURSERY SALESPERSON - RETAIL

Job Description:

Nursery Salespersons are directly responsible to office managers. They must be able to identify all the plant material produced and/or sold by their firm and appropriate uses for it. They must know sizes and grades of stock and current prices. They may advise customers concerning planting techniques and cultural practices required for successful growing of plant materials they sell. They may arrange displays of plants and related items, and prepare advertising announcements for various media. They must have sales ability and enjoy dealing with customers. Most Nursery Salespersons have had nursery experience and training beyond the high school level.

Competencies Identified and Validated

N = 41*

Competencies		Weighted Mean**
1.	Demonstrate knowledge of nursery retail outlet products.	3.0
	a. Identify nursery plants.	3.7
	b. Advise customer of correct manner of planting and caring for plant materials.	3.6
	c. Recognize common plant insect and disease problems and advise customers concerning insecticide and fungicide use.	3.3
	d. Advise customers concerning fertilizer types, rates, and methods of application for various plants.	3.3
	e. Explain environmental requirements of various plants.	3.2
	f. Explain appropriate uses and qualities of nursery stock.	3.2
	g. Recommend appropriate herbicides.	3.1
	h. Explain values of various mulching materials and soil amendments.	3.0
	i. Explain plant differences according to USA standard grades.	2.0
	j. Explain application and care of garden tools and equipment.	2.0
2.	Demonstrate effective sales techniques.	3.0

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* Responses from 41 Nursery Sales Outlet Personnel in 28 states. Survey conducted by Division of Resource Management, Agricultural Education, West Virginia University, Morgantown, West Virginia 26506.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a.	Greet customers in courteous manner.	3.8
	b.	Close sales efficiently.	3.6
	c.	Identify wants and needs of customers.	3.5
	d.	Fill out appropriate sales forms.	3.3
	e.	Gain attention and interest of customer.	3.3
	f.	Handle customer objections and complaints.	3.2
	g.	Direct attention to related or substitute products.	3.1
	h.	Make change.	2.8
	i.	Handle complaints after sale is made.	2.8
	j.	Use cash register.	2.7
	k.	Follow up sales to determine customer satisfaction.	2.6
	l.	Packs and/or wraps merchandise.	2.3
	m.	Take orders by telephone.	2.3
	n.	Solicit sales by telephone.	1.5
3.		Price stock (figure margins and markup).	2.1
4.		Maintain inventory of stock and related items.	2.3
5.		Prepare advertising announcements for various media.	1.1
	a.	Prepare newspaper advertisments.	1.2
	b.	Prepare mailers for local distribution.	1.0
	c.	Prepare radio commercials.	1.0
	d.	Prepare T.V. commercials.	.9
6.		Prepare merchandise displays.	2.8
	a.	Remove wilted stock from displays.	3.4
	b.	Present merchandise in attractive displays.	2.9
	c.	Display seasonal promotional items.	2.8
	d.	Suggest related items to customers with related merchandise displays.	2.8
	e.	Change displays frequently.	2.7
	f.	Arrange outside displays to attract customers.	2.7
	g.	Display merchandise as it can be used.	2.6
	h.	Include sales information in displays.	2.6

GOLF COURSE MAINTENANCE WORKER

Other Titles: Greenskeeper II, Golf Course Laborer.

Job Description:

Golf Course Maintenance Workers must be trained to do many different things. Once on the job they may be assigned a few specific tasks, achieving a certain amount of specialization. This would be true especially on the larger golf courses. Golf Course Maintenance Workers must, therefore, be prepared to do almost any of the kinds of work involved in, and essential to golf course maintenance operations. These tasks may include the mowing of greens, collars, aprons, fairways, and roughs; relocation of tee markers and cups, the raking of sand traps; assisting in the repair and servicing of various types of tools and equipment, and the performing of a great many other related duties. The more complex of these duties include construction of drainage facilities and the installation and repair of irrigation systems. In most golf course operations Maintenance Workers will be responsible to and work under the direct supervision of the golf course superintendents or other supervisory persons.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Maintain greens and tees.	2.9
a. Mow greens.	3.7
b. Mow collars.	3.7
c. Mow aprons.	3.7
d. Relocate cups.	3.7
e. Replace tee markers.	3.7
f. Relocate tee markers.	3.3
g. Repair divots.	3.0
h. Service and maintain ball washers.	3.0
i. Repair benches.	3.0
j. Apply fertilizer to greens.	2.9
k. Apply fungicides.	2.9
l. Aerify turf.	2.9
m. Apply herbicides (granules).	2.8
n. Verticut turf.	2.8
o. Apply topdressing.	2.7
p. Overseed turf.	2.7

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* Responses from 30 Golf Course Maintenance Workers in the Southeastern part of the United States. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

q.	Apply herbicides (liquid spray).	2.7
r.	Irrigate greens (manual system).	2.7
s.	Report insect damage.	2.5
t.	Mix herbicides.	2.4
u.	Mix insecticides.	2.4
v.	Mix fungicides.	2.4
w.	Report diseased turf.	2.2
x.	Report weed infestations.	2.2
2.	Maintain fairways, roughs, and traps.	3.1
a.	Add sand to traps.	3.6
b.	Hand rake sand traps.	3.6
c.	Re-establish turf by sprigging.	3.4
d.	Apply fertilizer to fairways.	3.3
e.	Mow fairways.	3.3
f.	Trim sand traps.	3.1
g.	Edge sand traps.	3.1
h.	Re-establish turf by sodding.	3.0
i.	Mow roughs.	2.9
j.	Power rake sand traps.	2.4
k.	Irrigate fairways (manual system).	2.4
3.	Carry out miscellaneous maintenance operations.	2.7
a.	Prune trees and shrubs.	3.1
b.	Remove trees and shrubs.	2.9
c.	Repair cart paths.	2.8
d.	Cut sod (operate sod cutter).	2.8
e.	Plant trees and shrubs.	2.7
f.	Mow and edge lake banks.	2.7
g.	Repair golf course signs.	2.7
h.	Trim (mow) banks of water hazards.	2.6
i.	Install tile drains.	2.6
j.	Apply herbicides for weed control in ponds and lakes.	2.3
4.	General maintenance of buildings and equipment.	2.8
a.	Clean hand tools and equipment.	3.7
b.	Check oil in motors of power driven turfgrass equipment.	3.5
c.	Clean mower blades.	3.3
d.	Sharpen hand tools.	3.3
e.	Pick up litter from grounds and playing areas.	3.2
f.	Sharpen mower blades.	3.0
g.	Clean spraying equipment.	3.0
h.	Check radiator on equipment.	2.9
i.	Check tires and tire pressure.	2.7
j.	Check battery on equipment.	2.7
k.	Grease tractors and other equipment.	2.4
l.	Repair irrigation pipes.	2.4
m.	Install irrigation valves.	2.4
n.	Change engine oil and filters.	2.2

o.	Extend irrigation systems.	2.1
p.	Tune up motors on equipment.	2.0
q.	Order repair parts.	2.0

MAINTENANCE WORKER - MUNICIPAL PARKS AND RECREATION AREAS

Job Description:

Working under the direct supervision of a Work Foreman or Crew Leader, Maintenance Workers perform a variety of tasks assigned to them. They plant, irrigate, mow, and trim grass; apply fertilizer and pesticides, cut and pull weeds, plant and prune trees and shrubs, take soil samples, maintain paths and walks, plant and care for flowers, and perform a variety of different kinds and pieces of equipment. They are required to service and maintain all of the tools and equipment they use. They should be trained in one or more areas of Ornamental Horticulture and must be able to get along well with others.

Competencies Identified and Validated

N = 30*

	Competencies	Weighted Mean**
1.	Effectively till the soil and establish seedbed.	3.1
a.	Apply lime and/or other soil amendments.	3.5
b.	Plow, roto till or otherwise prepare land.	3.5
c.	Level and smooth land preparatory to planting.	3.1
d.	Apply fertilizers according to soil test results.	2.1
2.	Plant grass, flowers, trees, and shrubs.	2.2
a.	Eliminate weeds in newly planted areas.	3.7
b.	Lay sod.	3.1
c.	Seed or transplant flowers.	3.1
d.	Apply supplemental fertilizer to planted areas as needed.	3.1
e.	Plant and/or transplant trees and shrubs.	3.0
f.	Roll newly planted sod or turf.	3.0
g.	Plant grass by seeding, sprigs, and/or plugs.	2.7
h.	Irrigate newly planted or established areas.	2.3
i.	Lay out land for planting according to space and landscape requirements.	1.8
3.	Maintain established turfgrass areas.	2.6
a.	Apply fertilizers to lawns and/or other turfgrass areas.	3.5
b.	Control insects, fungi, and weed pests.	3.4

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* Responses from 30 Maintenance Workers in the southeastern part of the United States. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Mow lawns and other turfgrass areas.	3.3
d.	Irrigate lawns and/or other turfgrass areas periodically as required.	2.8
e.	Slice or otherwise renovate turf as conditions require.	2.3
f.	Roll established turfgrass areas.	2.2
g.	Aerify established turf as necessary.	2.2
h.	Overseed established turfgrass areas.	2.1
i.	Apply topdressing as conditions require.	1.7
4.	Maintain trees, shrubs, and flowers.	2.9
a.	Apply fertilizers as needed.	3.5
b.	Control weeds, insects, and other pests.	3.2
c.	Irrigate trees, shrubs, and flowers as needed.	3.0
d.	Remove trees and shrubs.	2.9
e.	Trim trees, flowers, and shrubs.	2.6
f.	Provide support for trees as needed.	2.5
g.	Prune trees and shrubs.	2.3
5.	Carry out general grounds maintenance operations.	2.6
a.	Pick up paper, trash, and other refuse and keep grounds neat and clean.	2.8
b.	Clean drainage ditches and culverts.	2.6
c.	Repair and maintain walks and paths.	2.6
d.	Paint, mend, and otherwise repair benches, fences, signs, buildings, and storage areas.	2.6
e.	Maintain ponds, lakes and waterways.	2.5
6.	Service and maintain tools and equipment.	3.4
a.	Check oil, tire pressure, radiators, and batteries in all vehicles used.	3.6
b.	Clean all tools and equipment following use.	3.5
c.	Sharpen, service and/or adjust hand tools, lawn mowers and all other essential cutting equipment.	3.3
d.	Clean, repair and otherwise adequately service dusters, chemical sprayers, and fertilizer applicators.	3.3

WORK FOREMAN - MUNICIPAL PARKS AND RECREATIONAL AREAS

Other Titles: Head Groundskeeper, Work Supervisor.

Job Description:

Duties and responsibilities of Work Foremen vary slightly from one kind of operation to another depending on the nature and size of the facility. Normally Work Foremen are responsible to City Managers or some other persons who are appointed to be in charge of a given facility. Generally speaking Work Foreman are responsible for all planting and groundskeeping operations. They supervise laborers and other maintenance workers in the planting and pruning of trees and shrubs, in the application of fertilizers, in irrigating grass, flowers and trees, in cutting grass, in the maintenance of walks and paths and in performing all similar kinds of work required to maintain a facility in good order. They are familiar with all kinds of planting and maintenance equipment and are able to demonstrate its use to others. They assign work responsibilities to members of the work crew and checks and supervise them effectively in work performance. They must be able to get along and communicate effectively with their subordinates as well as with their superiors. Normally their training and experience is in Ornamental Horticulture or Agronomy.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Observe the work in progress and take the necessary precautions to insure the safety of workers and the quality of work performed.	3.8
2. Report any special problems to the supervisor and counsel with the supervisor in their solution.	3.6
3. Direct and supervise workers in mowing of turfgrass areas, in the application of fertilizer, pesticides, irrigation, and water for city parks, sports complexes, or recreation areas.	3.5
4. Arrange for the availability of all tools and equipment when needed and make sure that all tools and equipment used on the job are kept clean and in a good state of repair.	3.1

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* Responses from 30 Work Foremen of Municipal Parks and Recreational Areas in the southeastern part of the United States. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

5.	Appraise the time required for doing the various jobs and tasks needing to be done and make manpower assignments accordingly.	3.0
6.	Demonstrate the effective use of most tools and pieces of equipment operated by personnel.	2.9
7.	Fill in for the supervisor as occasion demands and perform other related work as required.	2.8
8.	Recommend and initiate personnel action such as promotion, discharges, disciplinary measures, and transfers for personnel.	2.8
9.	Maintain time records on personnel assigned as well as a time breakdown on jobs assigned.	1.9
10.	Recommend the purchase of new and useful equipment considered necessary for doing a good and efficient job.	1.5

GOLF COURSE MECHANIC

Job Description:

Golf Course Mechanics are directly responsible to the Golf Course Superintendent. They diagnose, repair, service, adjust, and maintain all kinds of engines and other equipment used on the golf course. They should be competent and skillful in all these areas and especially in the sharpening and adjustment of blades and cutting bars on all types of special turf mowers used on the golf course. They are responsible for keeping all types of equipment in a good state of repair and ready for use.

Competencies Identified and Validated

N = 30*

	Competencies	Weighted Mean**
1.	Repair, service, and maintain small engines, self-propelled and tractor drawn mowers, chemical sprayers, fertilizer spreader, golf carts, and other golf course machinery and equipment.	3.8
2.	Tune engines on tractors and other self-propelled equipment.	3.8
3.	Keep manuals and parts catalogs available for use in adjustment of different pieces of equipment and for ordering replacement parts as needed.	3.7
4.	Maintain a clean shop area.	3.7
5.	Repair and service hydraulic systems.	3.5
6.	Keep mower blades properly sharpened, and maintain all other types of machinery and equipment in good working order.	3.5
7.	Keep inventories of supplies and materials needed to maintain machinery and equipment.	3.5
8.	Maintain records on hours of equipment use, oil changes, engine fuel consumption, etc.	3.3
9.	Do welding, acetylene burning, brazing, and soldering as required.	3.3
10.	Overhaul small engines.	2.2
11.	Service, maintain, and repair irrigation equipment.	2.1

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* Responses from 30 Golf Course Mechanics in the southeastern part of the United States. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

GOLF COURSE PESTICIDE SPECIALIST

Job Description:

Golf Course Pesticide Specialists must be knowledgeable in regard to the effective and safe use of all pesticides. They decide what herbicides, fungicides, and insecticides are to be used on the golf course and closely supervise their use and application. They are licensed under EPA laws and regulations and should be able to communicate and get along well with subordinates, peers, and superiors.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Identify and report weeds, insects, and diseased turf problems.	3.8
2. Apply chemicals to control weeds, and/or turf diseases.	3.8
3. Mix chemicals for spraying insects, weeds, and/or diseased turf.	3.7
4. Remove aquatic weeds from ponds or lakes.	3.2
5. Trap rodents.	2.8
6. Poison rodents and insects.	2.7

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* Responses from 30 Golf Course Pesticide Specialists in the Southeastern part of the United States. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

GOLF COURSE WORK FOREMAN

Job Description:

Golf Course Maintenance Foremen work under Golf Course Superintendents and are responsible to the superintendent for all maintenance operations. They need to be able to handle, service, and operate all the tools and equipment required in doing the work. They must know the game of golf, and especially, they need to understand the importance of carrying out all maintenance work in a precise and timely manner. They are responsible for anticipating the needs of crew members for tools and equipment and for scheduling the needed tools and equipment in advance. Golf Course Work Foremen need to be good organizers and be able to instruct and communicate effectively with the maintenance personnel whose work they assign and for which they are responsible as well as with the Golf Course Mechanic and other cooperating personnel. They must be able to get along with crew members, keeping them happy and effectively employed in performing the more or less routine maintenance tasks assigned.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Instruct and supervise Golf Course Crew Workers in the performance of jobs assigned to them.	3.9
2. Demonstrate the effective and efficient use of all tools and/or equipment used in golf course maintenance operations where new employees are involved and when other circumstances require it.	3.8
3. Be responsible not only for quantity of work done by crew members, but also for the quality of this work and getting it done according to schedule.	3.5
4. Promote good human relations and correct any negative factors influencing worker cooperation and performance.	3.5
5. Be resourceful and exercise initiative within the limits of existing policy.	3.4
6. Be responsible for care and use of all equipment assigned to his personnel.	3.3

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* Responses from 30 Golf Course Work Foremen in the southeastern part of the United States. Survey conducted by the Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

7. Be responsible for the availability of tools and equipment needed by workers and also for its proper use and care. 3.0

8. Keep time records and a time breakdown on job assignments. 2.9

GOLF COURSE IRRIGATION SPECIALIST

Job Description:

Golf Course Irrigation Specialists are directly responsible to the Golf Course Superintendent. They must have a good knowledge of all types of irrigation systems used in modern golf course operations and be able to calculate turf moisture requirements for variable climatic and soil conditions. They decide how much irrigation water should be applied, when it should be applied, and either apply or effectively supervise its application in accordance with turf and soil moisture requirements. Also, they must have the ability to adjust and/or supervise the adjustment of time clocks, cycling schedules, irrigation pumps and all other mechanical operations of a system. They should be competent and correct in counciling and giving direction to the work foreman in the repair and maintenance of all kinds of golf course irrigation systems, being able to diagnose problems in an irrigation system and correct them.

Competencies Identified and Validated

N = 30*

	Competencies	Weighted Mean**
1.	Work closely with golf course superintendents and keep them duly informed of any irrigation problems which are or might be critical to the successful operation of the golf course.	3.8
2.	Operate time controlled automatic irrigation systems and personally supervise the operation of manual systems where they exist.	3.7
3.	Check, maintain, and supervise the repair of all automatic irrigation systems components.	3.7
4.	Be responsible for the irrigation of golf greens and fairways usually involving an automatic time controlled system.	3.7
5.	Perform related duties as required.	3.6
6.	Maintain a full log and watering schedule for all turf areas.	3.5
7.	Keep daily and year round rainfall records.	3.5

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* Responses from 30 Golf Course Irrigation Specialists in the Southeastern part of the United States. Survey conducted by Department of Agricultural and Extension Education, University of Florida, Gainesville, Florida 32601.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

8.	Maintain an adequate supply of valves, couplings, pipes, and other parts needed for the effective and efficient operation of the system.	3.5
9.	Install additions and extensions to existing irrigation systems as necessary.	3.3
10.	Check moisture penetration as necessary and maintains a regular watering schedule.	3.3
11.	Check, maintain, and supervise the repair of all golf course drainage installations.	2.9

RENEWABLE NATURAL RESOURCES

Occupations in this instructional area touch the lives of millions of persons living in the United States. Nearly everyone is interested in our renewable natural resources and well they should be. Clean air, pure water, and productive soil are basic to our health and productivity. Occupations surveyed in this National Study can be found on the pages listed below.

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AIR POLLUTION CONTROL INSPECTOR

Job Description:

The Air Pollution Control Inspector is responsible for field surveillance of air pollution. Documents the sources, quantity, and density of the air pollution. Investigates complaints by observing pollution conditions, interviews complaintants, owners, and operators of allegedly polluting equipment and facilities. Compiles detailed reports on complaint investigations together with recommendations as to corrective actions. Provides assistance to, may make work assignments to, and lead other employees. Assists professional staff in conducting special studies, assists in training lower level employees. Maintains an effective relationship with representatives of public and private agencies and organizations. Maintains and improves personal level of technical competency through reading and training. Usually works for a governmental agency.

Competencies Identified and Validated

N = 31*

Competencies		Weighted Mean**
1.	Inspect equipment semi-annually or annually.	3.3
	a. Inspect effectiveness of control devices.	3.4
	b. Locate quantity, density, and source of emission.	3.4
	c. Collect information about the equipment.	3.3
	d. Interact with personnel who operate the equipment.	3.1
	e. Make recommendations to company management when requested.	3.1
2.	Prepare and serve notices of violations.	3.5
	a. Identify the violator's name, address, etc.	3.8
	b. Describe and note conditions of violation.	3.8
	c. Record remarks made by operator.	3.3
	d. Recommend remedial action.	3.1
3.	Perform on-site inspections.	3.8
	a. Observe smoke stacks.	3.8
	b. Observe incinerators.	3.8
4.	Contact authority.	3.5
	a. Inform them of inspection.	3.6

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* Responses from 31 Air Pollution Control Inspectors and their work supervisors in 11 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Request needed assistance.	3.5
	c.	Review inspections with supervisors.	3.2
5.		Assist training lower-level employees.	3.0
	a.	Enforce employee safety regulations.	3.5
	b.	Demonstrate understanding of tasks performed.	3.2
6.		Conduct complaint investigations.	2.7
	a.	Visit complaintant to identify complaint, emission, source, time, and frequency.	3.8
	b.	Observe alleged source.	3.6
	c.	Arrange for an inspection.	3.4
	d.	Report steps taken.	3.3
	e.	Solicit local support.	2.8
	f.	Contact complaintant by phone.	2.7
7.		File reports.	3.7
	a.	Describe results of inspection.	3.7
	b.	Report suspected violations.	3.7
	c.	Follow-up inspections.	3.5
8.		Serve as a witness.	3.2
	a.	Present testimony.	3.3
	b.	Refer to file on history of case.	3.0
9.		Keep accurate records.	3.7
	a.	Record observation and data of inspection findings.	3.9
	b.	Compile reports on complaint investigations.	3.8
	c.	Record surveillance data.	3.5
	d.	Maintain daily records of activities.	3.4
10.		Perform public relations work.	2.9
	a.	Maintain an effective relationship with public and private agencies.	2.9
	b.	Act as a resource person.	2.1
	c.	Prepare information reports for public.	1.6
	d.	Write news releases.	1.3

AIR POLLUTION CONTROL TECHNICIAN

Other Titles: Environmental Inspector, Environmental Technician, Environmental Quality Engineer.

Job Description:

The Air Pollution Control Technician is responsible for installing, operating, modifying, maintaining, and repairing air sampling equipment. Conducts stack sampling activities and gathers data for source and emission; performs routine tests and measurements including standardized analyses of air pollutants. Fabricates field shelters and facilities, assists in the placement of air sampling and meteorological instruments and equipment. Operates and is responsible for the daily maintenance on vehicles used for field work; records, tabulates, charts, and graphs data obtained from air sampling equipment, meteorological instruments, and laboratory analysis; assists higher-level staff conducting the more complex tests, measurements, and analysis. Assists designing or modifying instruments and equipment, plus receiving and evaluating engineering proposals for new and modified industrial processes. Provides technical assistance, may make work assignments, and guides lower level employees; may attend air pollution control hearings to present data and is liable for a witness in a court issue. Assists in training lower level employees; maintains and improves technical competence through reading and training, works independently on specialized assignments; performs related duties as assigned.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Install air sampling equipment.	3.4
	a. Use safety standards in installation of equipment.	3.4
	b. Install in accordance with federal and state regulations.	3.4
	c. Utilize installation manual for each type of air sampling equipment.	3.3

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* Responses from 37 Air Pollution Control Technicians and their work supervisors in 12 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.	Operate air sampling equipment.	3.3
a.	Operate in accordance with federal and state regulations.	3.6
b.	Utilize the operator's manual.	3.5
c.	Maintain equipment according to operator's manual.	3.5
d.	Adjust equipment for maximum efficiency.	3.2
e.	Perform major maintenance of equipment.	2.7
3.	Conduct routine tests and measurements using standardized procedures.	2.4
a.	Record analyses of air pollutants.	3.0
b.	Tabulate, chart, and graph data.	2.9
c.	Perform ambient air monitoring.	2.9
d.	Test for amount of emission.	2.8
e.	Record data on type of emission.	2.7
f.	Measure for sources of pollutants.	2.5
g.	Record data from meteorological instruments.	2.5
h.	Perform stack gas sampling.	2.0
i.	Perform exhaust emission tests from moving sources.	1.5
j.	Conduct industrial hygiene surveys.	0.7
4.	Assist in reviewing and evaluating proposals for equipment changes.	1.7
a.	Review and evaluate existing process and associated equipment.	1.7
b.	Make recommendations in accordance with state and federal regulations.	1.7
c.	Assist in the review of engineering proposals and drawings for new or modified industrial processes and facilities.	1.6
5.	Supervise non-professional and temporary field personnel.	2.1
a.	Interpret directions and plans.	2.2
b.	Demonstrate a general understanding of the tasks performed by all employees under his supervision.	2.2
c.	Enforce employee safety regulations and standards.	2.1
d.	Train new personnel.	2.1
e.	Plan and supervise work schedules.	1.8
6.	Attend air pollution control hearings and professional meetings.	1.9
a.	Testify as a witness in court cases.	2.0
b.	Present evidence and data.	1.9
7.	Perform public relations work.	1.1
a.	Explain general program and specific objectives to individuals and groups.	1.7

b.	Conduct educational tours.	1.5
c.	Act as a resource person in program area.	1.2
d.	Prepare informative reports and other literature for public use.	1.0
e.	Participate in radio and television programs.	0.8
f.	Write news releases.	0.6
8.	Operate equipment and machinery.	3.0
a.	Recognize malfunctions in equipment.	3.4
b.	Adjust equipment under field conditions for maximum efficiency.	3.3
c.	Become familiar with operator's manual for each piece of equipment.	3.3
d.	Use safety standards relating to the operation of a particular piece of machinery.	3.2
e.	Maintain records of maintenance and repair of machinery and equipment.	3.2
f.	Service machinery and equipment according to operator's manual.	3.1
g.	Operate machinery and equipment under a variety of field conditions.	3.1
h.	Attach accessory equipment to basic power unit.	2.8
i.	Hold a valid operator's license where necessary.	2.8
j.	Maintain a daily log of number of hours each piece of equipment is used.	2.7
k.	Prepare machines and equipment for storage.	2.5

FISH CONSERVATION OFFICER

Other Titles: Waterways Patrolman, Fish Warden.

Job Description:

Patrols assigned areas to prevent fish law violations; issues warnings and citations; services warrants, makes arrests and prepares and presents evidence in court; seizes equipment used in fish law violations and arranges for disposition of fish illegally taken or possessed; obtains samples of fish from creels of fishermen for studies by fisheries biologists; works irregular hours under varied climatic conditions; maintains public relations with sportsmen's organizations; investigates pollution reports; works with groups for stream improvement.

Competencies Identified and Validated

N = 37*

Competencies	Weighted Mean**
1. Enforce law on boating and fishing.	3.5
a. Know federal and state laws on fishing and boating.	3.6
b. Check licenses for fishing and boating.	3.5
c. Use firmness and tact.	3.5
d. Investigate and arrest violators.	3.5
e. Prevent fish law violations.	3.4
f. Issue warnings and citations.	3.3
2. Prepare cases for prosecution.	3.3
a. Obtain evidence for legal action.	3.7
b. Testify in legal action.	3.6
c. Obtain and serve warrants.	3.1
d. Consult a legal opinion.	2.9
3. Prepare and keep records in cooperation with fishery biologists.	1.4
a. Keep record of fish taken in area.	1.5
b. Evaluate fish habitat.	1.5
c. Inventory species of fish in area.	1.3
d. Determine available feed for fish.	1.3
4. Maintain fish population in area.	1.5
a. Recommend stocking procedure.	1.5

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* Responses from 37 Fish Conservation Officers and their work supervisors in 22 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Recommend fishing season.	1.4
	c.	Recommend fish refuges.	1.4
5.	Dispose of fish killed accidentally or illegally.		2.1
	a.	Prepare report on incident.	2.4
	b.	Dispose of dead fish properly.	1.9
6.	Explain fishing and boating laws to public.		3.4
	a.	Keep aware of new law changes.	3.6
	b.	Explain and interpret provisions of the law.	3.5
	c.	Give talks to groups upon request.	3.1
7.	Provide public relations.		2.4
	a.	Address audience interested in fishing.	2.8
	b.	Assist sportsmen's clubs in fishing interest.	2.7
	c.	Distribute brochures, pamphlets.	2.5
	d.	Participate in radio and TV programs.	2.3
	e.	Write newspaper articles for publication.	1.7
8.	Supervise public in stream improvement project.		1.5
	a.	Aid biologists in planning.	1.8
	b.	Provide publicity.	1.6
	c.	Organize work and program.	1.5
	d.	Provide fish.	1.0
9.	Investigate pollution reports.		2.6
	a.	Report polluters.	3.3
	b.	Take water samples to be analyzed.	2.8
	c.	Monitor potential pollutors.	2.3
	d.	Advise public on pollution problems.	2.2
10.	Operate boats and equipment.		3.3
	a.	Patrol restricted areas.	3.6
	b.	Handle safely all types of small craft under variety of field conditions.	3.6
	c.	Travel to observe persons fishing or boating.	3.5
	d.	Keep boat in working order.	3.5
	e.	Recognize malfunctions in equipment.	3.3
	f.	Adjust equipment under field conditions.	3.2
	g.	Hold a valid operator's license when necessary.	2.9
	h.	Know how to service outboard motors and adjust them for maximum efficiency.	2.8
11.	Maintain a district office.		3.0
	a.	Communicate with supervisor and clientele.	3.5
	b.	Keep complete files on all reports.	3.0
	c.	Maintain records on all surveys.	2.6

FISH HATCHERY WORKER

Other Titles: Fish Hatchery Superintendent, Hatchery Man, Fish Hatchery Assistant, Fish Culturist, Fish Hatchery Manager, Hatchery Aide, Fish Technician.

Job Description:

Installs and maintains racks and traps; spawns fish; packs, transfers and incubates eggs; hatches fish; prepares food and feeds fish; cleans troughs, ponds and equipment; places fish in ponds; repairs and improves ponds, equipment and hatchery grounds; tests for oxygen deficiency and pH level in ponds; measures water temperature; handles live fish; helps keep records and prepares reports; collects data on fish habitat conditions and helps analyze reports; operates related fish hatchery equipment.

Competencies Identified and Validated

N = 40*

Competencies		Weighted Mean**
1.	Identify species of gamefish, panfish, baitfish, and trashfish.	2.7
a.	Understand feeding habits.	2.9
b.	Recognize shapes and sizes.	2.8
c.	Know coloration.	2.6
d.	Recognize fish habitat.	2.6
2.	Identify and properly use tools for work.	3.5
a.	Practice safety while using tools.	3.6
b.	Keep tools in good working order.	3.5
c.	Know how to use fish nets.	3.4
3.	Operate and maintain hatchery equipment.	3.0
a.	Understand operation of equipment.	3.6
b.	Practice safety when using equipment.	3.6
c.	Use pumps and aerators.	3.4
d.	Clean service tanks.	3.1
e.	Operate mechanical fish sorting device.	2.8
f.	Handle boats.	2.7
g.	Build racks and traps.	2.7
h.	Adjust racks and traps.	2.7
4.	Help maintain buildings and grounds.	2.4

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* Responses from 40 Fish Hatchery Workers and their work supervisors in 27 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a. Assist in carpentry work.	2.6
	b. Paint buildings.	2.5
	c. Mow, fertilize, and irrigate grass.	2.5
	d. Pour and repair concrete.	2.3
	e. Care for trees and shrubs.	2.3
5.	Perform mathematical computations.	3.1
	a. Count and record number of fish.	3.5
	b. Read thermometers and record readings.	3.5
	c. Count and record number of fish spawned.	3.3
	d. Determine feed ratios.	3.0
	e. Prepare statistical reports.	2.3
6.	Record activities.	2.9
	a. List mortality rate.	3.3
	b. Keep a work diary.	3.1
	c. Prepare order forms.	2.3
7.	Prepare hatchery tanks for spawning.	3.2
	a. Clean and repair tanks.	3.4
	b. Fill tanks.	3.2
	c. Determine stocking rate for tank.	2.8
8.	Spawn fish.	3.1
	a. Collect sperm and then fertilize eggs.	3.3
	b. Sort various species of fish.	3.2
	c. Understand life cycle of fish.	3.1
	d. Know breeding habits.	3.1
	e. Calculate time and frequency of fertilization.	2.7
9.	Recognize diseased and unfertilized eggs.	3.2
	a. Report findings.	3.6
	b. Treat diseases as directed.	3.6
	c. Determine proper amount of feed.	3.3
	d. Prepare food.	2.8
	e. Determine proper aquatic rations.	2.2
10.	Feed fish.	3.0
	a. Know different types and forms of feed.	3.4
	b. Dispense food.	3.4
	c. Determine proper amount of feed.	3.3
	d. Prepare food.	2.8
	e. Determine proper aquatic ration.	2.2
11.	Check oxygen level, pH, temperature, and hardness of water.	3.0
	a. Report findings.	3.1
	b. Use special measuring equipment.	3.0
	c. Compile data.	2.9
	d. Use chemicals as directed to offset certain deficiencies.	2.8

12.	Determine stocking rate for ponds.	2.0
a.	Calculate surface and running water.	2.3
b.	Estimate stocking rate.	2.0
c.	Establish time for stocking.	2.0
d.	Measure food resources.	1.8
13.	Handle fish.	3.3
a.	Transfer fish without harming.	3.7
b.	Stock ponds and streams.	3.3
c.	Use nets to collect fish.	3.2
d.	Know different ways of stocking fish.	3.0
14.	Control undesirable vegetation.	2.3
a.	Recognize algae blooms.	2.5
b.	Use chemicals or physical means to control aquatic weeds.	2.4
c.	Know common aquatic weeds.	2.3
d.	Understand biological control.	2.2
15.	Understand economics.	1.0
a.	Determine overhead expenses.	1.3
b.	Calculate potential income of private hatchery.	1.1
c.	Realize if there is a market for fish.	1.0
d.	Sell fish.	0.9
16.	Practice good management principles.	2.1
a.	Use proper hatching procedures.	3.1
b.	Understand fish laws of state.	2.9
c.	Keep records of expenses, tools, fish sold, etc.	1.9
d.	Recruit labor needed.	1.5
e.	Know when to sell fish.	1.0

FISH RESEARCH TECHNICIAN

Other Titles: Fisheries Management Specialist, Fish Conservation Technician, Fisheries Biologist, Fisheries Laboratory Technician.

Job Description:

Aid fish biologist in studies of fish nutrition, behavior, physiology, reproduction; captures fish for study; marks and transfers fish from one area to another; conducts biological studies of fish populations; records such data as size; fecundity of females and stomach contents; studies daily and seasonal movements and feeding habits of fish populations; collects and compiles fisheries resource data and prepares reports; works under varying climatic conditions; performs general maintenance of fish culture equipment and facilities.

Competencies Identified and Validated

N = 37*

Competencies	Weighted Mean**
1. Aid fish biologist in performing research studies.	2.9
a. Prepare physical set up for experiments.	3.1
b. Collect samples for studies of suspected pollution.	3.1
c. Assist in pick-up and delivery of supplies.	2.7
2. Supervise non-professional and field personnel.	2.2
a. Interpret directions and plans.	3.1
b. Enforce employee safety regulations and standards.	2.4
c. Plan and supervise work schedule.	2.2
d. Organize hatchery and personnel functions.	1.3
3. Recognize symptoms and know controls of common fish diseases and parasites.	2.1
a. Identify diseased fish.	2.4
b. Aid in treatment of diseased fish.	2.3
c. Control parasites, pathogens and diseases as directed by supervisor.	2.2
d. Identify fish parasites.	2.0
e. Identify fish pathogens.	1.7
4. Conduct stream and lake surveys.	2.9

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* Responses from 37 Fish Research Technicians and their work supervisors in 27 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

a.	Collect fish for study.	3.4
b.	Collect water samples for chemical analysis.	3.1
c.	Study fish populations.	2.8
d.	Estimate water volume of streams, lakes and ponds.	2.7
5.	Collect aquatic weed samples.	2.0
a.	Identify aquatic weeds.	2.3
b.	Remove selected samples of weeds.	2.0
c.	Know growth habits of weeds.	1.9
d.	Apply physical and chemical controls of weeds.	1.9
6.	Use laboratory equipment.	2.2
a.	Use concepts of chemistry, physics, and biology to help conduct tests.	2.8
b.	Use balances and microscopes.	2.8
c.	Clean laboratory areas and equipment.	2.7
d.	Operate auto-sampling equipment.	2.3
e.	Test and evaluate equipment.	2.2
f.	Prepare media for bacteriological tests.	2.0
g.	Prepare fish samples for tissue processing.	2.0
h.	Operate water distillation unit and autoclave.	1.9
i.	Take blood samples.	1.5
7.	Perform chemical and physical analysis of water.	2.3
a.	Check water for pH, hardness, and pollution.	3.2
b.	Check for algae growth.	2.7
c.	Determine excessive amounts of chemical elements.	2.7
d.	Set up water quality experiment equipment.	2.0
e.	Operate water quality equipment including:	
(1)	Hach chemistry kit.	2.6
(2)	Ozonator.	1.7
(3)	Weiss Saturometer.	1.6
8.	Install and calibrate rain gauges, pH meters, lysine and current meters.	2.8
a.	Operate equipment under a variety of field conditions.	2.9
b.	Adjust equipment under field conditions for maximum efficiency.	2.9
c.	Service equipment according to operator's manual.	2.8
d.	Recognize malfunctions in equipment.	2.8

9.	Compile fisheries resource data.	3.0
a.	Measure age and size of fish.	3.3
b.	Conduct census of fish populations.	3.2
c.	Prepare illustrations, tables, and graphs for reports on data.	2.9
d.	Determine fecundity of females.	2.8
e.	Study daily and seasonal movements of fish and their feeding habits.	2.7
10.	Maintain fish culture equipment and facilities.	1.8
a.	Maintain nets, graders, aerators, and related equipment.	2.7
b.	Service on-site equipment.	2.5
c.	Maintain experimental fish lots.	2.3
d.	Clean and repair ponds, screens, and tanks.	2.2
11.	Communicate with public.	2.1
a.	Conduct educational tours.	2.3
b.	Assemble handout literature.	2.0

FORESTRY TECHNICIAN

Other Titles: Forest Technician, Log Scaler, Field Service Technician, Associate Forester, Associate Procurement Forester.

Job Description:

The Forest Technician is a person competent to occupy a responsible position in the line of authority between the skilled forest workers and the professional forester. The Forest Technician differs from the semi-skilled forester (aide) in knowledge of forestry theory and methods and has a more limited or specialized background and in the use of technical skills in support of forestry activities than a forester. The majority of Forest Technicians are employed by state and federal governments. Others work for private industry and forest owners. Examples of the type of work forest technicians perform are: forest surveying that includes boundary problems, deed research, campground, and pond layout; road location and reconnaissance, elevation and drainage systems; timber cruising and volume estimating; forest inventory work; timber sale layout and marking; timber buying; log and pump scaling; timber stand improvement; nursery cultural work in forest nurseries; fire control and assisting in presuppression and suppression activities; forest insect and disease observation and control; and park and recreation management of private and public campground and parks.

Competencies Identified and Validated

N = 35*

Competencies		Weighted Mean**
1.	Survey timber land and other areas.	2.9
a.	Interpret and use aerial photographs, topographic, and planimetric maps.	3.6
b.	Establish boundary lines.	3.4
c.	Locate logging and access roads.	3.0
d.	Perform semi-accurate, long distance survey approximations.	2.7
e.	Establish elevations for roads and drainage systems.	2.7
f.	Locate areas for dams, impoundments, ponds, and recreational uses.	2.1

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* Responses from 35 Forestry Technicians and their work supervisors in 20 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.	Prepare maps.	3.3
a.	Perform neat, accurate mapping work.	3.6
b.	Interpret aerial photographs to determine areas and locations.	3.5
c.	Use various, simple drafting instruments.	3.3
d.	Calculate areas from survey data.	3.1
e.	Use survey data to prepare maps.	3.0
3.	Cruise timber.	3.3
a.	Measure tree heights and diameters.	3.7
b.	Interpret aerial photographs to identify forest cover types, forest classes and areas.	3.4
c.	Lay out sample plots or strips.	3.4
d.	Calculate volume of stands.	3.4
e.	Determine saleable volume in forest products.	3.4
f.	Keep records.	3.4
g.	Mark timber for sales or for partial cutting.	3.4
h.	Locate logging roads and aid in their construction and maintenance.	3.2
i.	Measure tree growth.	3.1
j.	Prepare inventory reports and stand analysis data.	3.1
k.	Recommend logging methods.	2.7
4.	Supervise timber sales.	3.0
a.	Create and maintain safety attitudes and practices.	3.5
b.	Compute gross and net volumes.	3.2
c.	Scale forest products.	3.0
d.	Check scales for possible errors.	2.9
e.	Interpret and enforce timber sale contracts.	2.8
f.	Grade forest products.	2.7
5.	Perform timber stand improvement work.	2.9
a.	Create and maintain safety attitudes and practices.	3.3
b.	Instruct and assist crews in work methods.	3.1
c.	Keep records.	3.1
d.	Demonstrate proper cultural methods.	2.9
e.	Prepare work layout and schedule.	2.7
f.	Procure and mix chemicals.	2.4
6.	Plant trees and collect seeds.	2.7
a.	Assist in planning reforestation work.	3.0
b.	Protect planting stock.	2.9
c.	Follow planting plan.	2.9
d.	Plan and perform erosion control and recreational construction landscape planting.	2.6

	e.	Prepare planting site.	2.5
	f.	Procure planting stock.	2.5
7.	Perform nursery cultural work.		2.2
	a.	Keep records.	2.4
	b.	Hire temporary personnel.	2.3
	c.	Supervise seedling production, lifting, packaging, and shipping.	2.3
	d.	Treat seeds.	2.2
	e.	Conduct seed tests.	2.1
	f.	Calculate and analyze data.	1.8
8.	Control forest insects and disease.		3.0
	a.	Recognize and report insect and disease damage.	3.4
	b.	Prepare maps of infested areas.	3.3
	c.	Assist in insect and disease control measures.	3.1
	d.	Record, calculate, and analyze data.	2.8
	e.	Conduct experiments.	2.3
9.	Prevent and control forest fires.		2.6
	a.	Locate and report fires.	3.2
	b.	Serve as fire crew leader.	3.1
	c.	Operate fire tools and equipment.	3.0
	d.	Submit fire reports.	2.9
	e.	Assist in determining causes of fires and best control methods.	2.8
	f.	Maintain fire control supplies and equipment.	2.7
	g.	Dispatch fire crews.	2.6
	h.	Educate communities in fire prevention.	2.5
	i.	Measure fire characteristics.	2.4
	j.	Record fire crew time and material inventories.	2.4
	k.	Test best methods and materials for fire prevention and control.	2.3
	l.	Recruit, train and supervise forest fire wardens and crews.	2.2
	m.	Display a basic knowledge of air craft capacity for fire fighting methods.	1.9
10.	Administer outdoor recreational facilities.		2.5
	a.	Enforce rules and regulations.	2.6
	b.	Assist in planning, construction, operation, and maintenance of trails, campsites, etc.	2.4
	c.	Conduct public relations program.	2.4
	d.	Perform fire watch and control.	2.4
11.	Perform watershed practices.		2.5
	a.	Control flood run-off to reduce soil damage.	2.6

b.	Maintain soil stability.	2.6
c.	Improve vegetative cover.	2.5
12.	Manage fish and wildlife food habitat.	1.9
a.	Assist in wildlife habitat improvement.	2.4
b.	Supervise work crews.	2.3
c.	Maintain daily crew records.	2.2
d.	Assist in taking wildlife census.	2.0
e.	Perform research studies and experiments.	1.9
f.	Supervise controlled hunting and fishing.	1.8
g.	Manage animal use of grazing lands.	1.7
h.	Reseed grazing lands.	1.7
i.	Stock, rear, and feed fish and game species.	1.6
j.	Keep hunting and fishing records.	1.5
k.	Patrol restricted areas.	1.4
13.	Perform public relations work.	2.3
a.	Explain forestry objectives to individuals and groups.	3.1
b.	Prepare informative reports.	2.8
c.	Prepare literature for public use.	1.9
d.	Obtain and interpret pertinent information from public records.	1.9
e.	Write news releases.	1.8
14.	Operate equipment and machinery.	2.6
a.	Hold a valid operator's license where necessary.	3.3
b.	Use safety standards relating to the operation of a particular piece of machinery.	3.1
c.	Recognize malfunctions in equipment.	2.9
d.	Adjust equipment under field conditions for maximum efficiency.	2.8
e.	Become familiar with operator's manual for each piece of equipment.	2.7
f.	Operate machinery and equipment under a variety of field conditions.	2.7
g.	Service machinery and equipment according to operator's manual.	2.5
h.	Maintain a daily log of number of hours each piece of equipment is used.	2.5
i.	Maintain records of maintenance and repair of machinery and equipment.	2.4
j.	Attach accessory equipment to basic power unit.	2.1
k.	Prepare machines and equipment for storage.	1.9

LAND USE PLANNING AIDE

Other Titles: Surveyor's Apprentice, Engineering Aide, Field Engineering Aide, Party Chief.

Job Description:

The Land Use Planning Aide, under the direction of the survey party chief, sets up and operates surveying equipment; acts as a rodman and chainman; takes field notes and makes field sketches; measures distances, angles and elevations between stadia points; collects data pertinent to field studies; conducts field investigations to assure development concurs with project uses; and submits reports on the findings.

Competencies Identified and Validated

N = 34*

Competencies	Weighted Mean**
1. Set up surveying equipment.	2.8
a. Adjust and center tripod over points using plumb bob.	3.0
b. Level instrument parallel to datum plane using levelling bubble.	2.9
c. Carry and set stakes.	2.8
d. Hold level-rod or stadia-rod.	2.8
e. Secure instrument to tripod.	2.8
f. Shield and carry optical equipment.	2.7
2. Determine area measurements.	2.9
a. Measure distances between points with transit and rod, cloth or steel tape, or surveyor's chain.	3.2
b. Use photo-scales.	3.0
c. Locate ground positions relative to maps.	2.9
d. Use compass, aerial photographs, and topographic maps to pin-point positions.	2.8
e. Record information on aerial photographs or in notes.	2.8
f. Select turning points in consideration of immediate terrain and of the necessity for balancing shots.	2.8

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* Responses from 34 Land Use Planning Aides in 16 states. Survey conducted by Department of Agricultural Education. The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Act as a rodman.		2.8
	a.	Mark and record measuring points using paints, stake, keel, or tacks.	2.9
	b.	Move rod, or target on rod, following instructions of instrumentman.	2.8
	c.	Call out readings to notekeeper, or write station number and reading in notebook.	2.7
4.	Act as chainman.		2.4
	a.	Measure distances between survey points using cloth or steel tape, or surveyor's chain.	2.9
	b.	Use tape supports or tension meters.	2.6
	c.	Set taping arrows.	2.4
	d.	Check tape calibration by comparison with master tape.	2.3
	e.	Cut and clear brush from survey line.	2.3
	f.	Set traffic warnings.	2.3
	g.	Act as a flagman.	2.1
5.	Act as instrumentman.		2.8
	a.	Measure elevations using altimeter, level, or transit.	2.9
	b.	Measure angles between survey points using compass or transit.	2.9
	c.	Measure distances between survey points using transit.	2.7
	d.	Direct rodman by voice or hand signals.	2.7
	e.	Maintain surveying instruments.	2.6
6.	Act as notekeeper.		2.9
	a.	Record all distances, angles and elevations measured.	3.1
	b.	Make simple arithmetic calculations.	3.1
	c.	Calculate simple closures of level circuits and slope corrections.	3.1
	d.	Draw field sketches of area using map symbols.	2.9
	e.	Solve simple trigonometric problems.	2.7
	f.	Prepare daily record of activities.	2.7
	g.	Record corrections for declination and climatic factors.	2.6
7.	Compile data for planning studies.		2.7
	a.	Gather area maps.	2.9
	b.	Relate aerial photographs to topographic maps.	2.9
	c.	Compile economic, geographic, and other literature pertinent to area.	2.7
	d.	Gather name and boundary information.	2.7
	e.	Report on area movement concerning traffic flows, population, business, and agriculture.	2.4

	f.	Observe and report on available facilities and needs for housing, parking, recreation, and education.	2.2
8.		Perform clerical office work.	2.8
	a.	Transpose field notes and sketches to topographic maps.	2.8
	b.	Transpose approved field notes to map symbols.	2.8
	c.	Aid in preparing tracing of topographic area.	2.8

LAND USE PLANNING TECHNICIAN

Other Titles: Planning Assistant, Landscape Craftsman, Cartographer, Planner I.

Job Description:

The Land Use Planning Technician compiles and summarizes data collected from maps, reports, field investigations, and books for planning and zoning studies; prepares illustrations concerning population, transportation, zoning, land use, proposed sub-divisions, and public utilities for planning studies; makes charts, graphs, tabulations, detailed drawings, and tracings; prepares blueprints; forms photogrammetric mosaics of areas; forecasts area movements of business, population, industry, and agriculture; assists in the preparation of three-dimensional relief maps.

Competencies Identified and Validated

N = 34*

Competencies		Weighted Mean**
1.	Compile data for planning studies.	2.9
a.	Collect information on area topography, such as soil types, land features, electric, and telephone lines, and road systems.	3.4
b.	Study aerial photographs and topographic maps of area.	3.4
c.	Investigate existing land use.	3.4
d.	Determine existing and proposed zoning, subdivisions, and activities.	3.3
e.	Assemble data on population growth.	3.1
f.	Read and summarize reports.	2.9
g.	Study existing public utilities and projected needs.	2.8
h.	Survey existing recreational facilities and projected needs.	2.7
i.	Evaluate traffic movements and systems.	2.4
j.	Survey public and merchandise transportation.	2.4
k.	Survey educational facilities and project needs.	2.4
2.	Prepare illustrations for planning studies.	3.2
a.	Tabulate field investigation reports.	3.5

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* Responses from 34 Land Use Planning Technicians in 17 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Secure map data from files.	3.3
c.	Graph inter-related planning concerns, such as population, traffic, etc.	3.0
d.	Chart movement of people, business, etc., within an area.	2.8
3.	Prepare detailed sketches and drawings.	2.6
a.	Interpret sketches, diagrams, topographic, and planimetric maps.	3.2
b.	Select scales and determine scaled dimensions.	3.0
c.	Prepare tracings and blueprints using light table and mimeoscope.	2.8
d.	Interpret aerial photographs.	2.8
e.	Plot distances and elevations.	2.7
f.	Classify and show roads, buildings, and woodlands.	2.7
g.	Sketch contours.	2.6
h.	Use standard engineering handbooks, guides, designs, and procedures in selecting and adapting practices to fit local positions.	2.6
i.	Apply design specifications.	2.5
j.	Determine radii and point locations from specifications and field notes.	2.5
k.	Use mathematics, conversion tables, and slide rules.	2.4
l.	Run lines of stadia traverse.	1.6
4.	Apply land use conservation principles.	2.3
a.	Report on needs for educational and recreational facilities.	2.4
b.	Determine projected needs for public utilities.	2.2
5.	Have proficiency in mechanical drafting techniques.	2.5
a.	Draw lines and parallels using straight edge and T-square.	2.6
b.	Measure scaled distances and radii using compasses and calipers.	2.6
c.	Use templates and lettering guides for precision work.	2.6
d.	Draw preliminary and final lines and letters using lead and lead holders, pens, brushes, and ink.	2.6
e.	Measure angles and draw parallel lines not parallel or perpendicular to the T-square.	2.5
f.	Reproduce drawings by tracing or blueprints using light-tables, mimeoscopes, diazo equipment, spirit duplicators, and other devices.	2.5
g.	Lay out and ink lines and letters using brushes and pens to produce lines of varying weight, according to the scaled drawing size.	2.4

6.		Perform cartographic work.	1.6
	a.	Compile routine features such as road systems, drainage systems, and sparsely populated areas.	2.2
	b.	Measure distances between reference points and establish exact relative distances using a compass or other device.	1.9
	c.	Scribe color-separation drawings.	1.8
	d.	Form photogrammetric mosaics of areas, maintaining precise scaled distances.	1.7
	e.	Assemble and index uncontrolled mosaic.	1.6
	f.	Apply photovision techniques.	1.6
	g.	Convert grid values of geodesic positions to values suitable for base scale of base sheet.	1.6
	h.	Erase obsolete chart details and hand stamp new details.	1.6
	i.	Compile and adjust contours by extraction and interpolation.	1.5
	j.	Perform elementary compilation-scribing.	1.5
	k.	Pick and transfer center and pass points using a steroscope for slotted template control procedures.	1.4
	l.	Operate contact printer, sort and dry prints.	1.4
7.		Assist in the preparation of three-dimensional relief models.	2.0
	a.	Determine scaled distances from photomosaics, maps, and specifications.	2.2
	b.	Draft scaled dimensions on materials to be cut.	1.9
	c.	Detail appropriate areas with inks or paints.	1.9
	d.	Cut and mount materials onto backing board.	1.8
8.		Supervise non-professional and temporary field personnel.	2.4
	a.	Interpret directions and plans.	3.0
	b.	Train new personnel.	2.4
	c.	Demonstrate an understanding of the tasks performed by all employees under his supervision.	2.4
	d.	Enforce employee safety regulations and standards.	2.2
	e.	Plan and supervise work schedules.	2.2

ZONING COMPLIANCE OFFICER

Other Titles: Zoning Inspector, Zoning Technician.

Job Description:

The Zoning Compliance Officer inspects the uses of land and buildings to assure their compliance with local and state ordinances; works with owners in pre-renovation planning; issues building and occupancy permits; inspects buildings under construction for proposed usage, adherance to standards of engineering and architecture, and compliance with safety regulations; handles zoning change requests.

Competencies Identified and Validated

N = 48*

Competencies	Weighted Mean**
1. Issue zoning permits and inspect for regulation compliance.	3.2
a. Check zoning ordinances for usage compliance.	3.8
b. Make decisions based on interpretations of rules and regulations.	3.6
c. Check sizes of courts, yards, and other open spaces.	3.4
d. Inspect location and use of buildings, structures, and land for trade, industry, residence, or other purposes.	3.4
e. Record appropriate data.	3.4
f. Check height, number of stores, and size of building.	3.3
g. Regulate lot percentage that building occupies.	3.1
h. Check for compliance of sub-division of municipalities into districts of such number, shape, and area as may be best suited to carry out the purposes of land-use planning specified by the zoning regulations.	3.1
i. Collect necessary fees.	2.7
j. Check the population density by use in relation to lot size.	2.5
2. Inspect existing structures, and structures under construction for compliance with applicable ordinances, laws, and regulations.	3.2

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* Responses from 48 Zoning Compliance Officers in 18 states. Survey conducted by Department of Agricultural Education. The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a.	Re-inspect to check for compliance.	3.3
	b.	Refer items of non-compliance to proper authorities for further action.	3.3
	c.	Recommend necessary action to correct discrepancies.	3.2
	d.	Officially notify owners in writing of the discrepancies noted.	3.2
	e.	List all discrepancies and non-compliance.	3.1
3.		Issue building permits.	3.0
	a.	Check zoning ordinances to see if construction conforms with land use.	3.5
	b.	Make decisions based on interpretations of laws and ordinances.	3.2
	c.	Record appropriate data.	2.9
	d.	Collect necessary fees.	2.9
	e.	Inspect plans for compliance with safety and architectural standards.	2.1
4.		Enforce zoning ordinances.	2.9
	a.	Inspect for compliance with regulations concerning lot size, and location of building on lot with regard to set backs from public right-of-way, side yards, and rear yards.	3.6
	b.	Interpret laws and regulations as an enforcement guide.	3.4
	c.	Testify in civil suits.	2.9
	d.	Issue summonses for violations.	2.5
	e.	Recommend condemnation for buildings if unfit for human habitation.	2.2
5.		Give advice on pre-construction planning.	3.1
	a.	Familiarize owners with ordinances affecting them.	3.3
	b.	Interpret ordinances as a planning guide.	3.1
	c.	Make necessary recommendations.	2.9
6.		Handle zoning variances.	2.8
	a.	Make decisions based on ordinances.	2.9
	b.	Process requests for variance.	2.7
	c.	Testify at hearings.	2.7
7.		Receive requests for zoning changes.	2.7
	a.	Review and interpret existing regulations.	2.9
	b.	Collect materials concerning proposed change.	2.7
	c.	Process requests for changes.	2.5
	d.	Testify at hearings.	2.5

8.	Issue occupancy permits.	2.4
a.	Use laws and regulations in decisions.	3.0
b.	Inspect building to see that occupancy conforms with use.	3.0
c.	Collect necessary fees.	2.3
d.	Verify perculation tests for sewerage lines.	2.3
9.	Prepare records and reports.	3.2
a.	Submit reports to officials as requested.	3.5
b.	Keep records of permits issued and fees collected.	3.2
c.	Process and record zoning variance and zoning change requests, and their outcomes.	3.2
d.	Record data of all inspections made.	3.1
e.	Keep records of summonses issued.	3.0

COMMERCIAL FISHERMAN

Other Titles: Commercial Salmon Troller, Deck Hand, Boat Puller, Owner, Operator, Captain, Draggerman, Sternman.

Job Description:

Handles small and large boats; knowledgeable about dead reckoning; piloting and electronic navigation; ties knots and splices and repairs nets; knowledgeable about fishing operations, fishing gear and the fishing business; is an able seaman; understands Coast Guard rules and regulations.

Competencies Identified and Validated

N = 39*

Competencies	Weighted Mean**
1. Recognize the differences in fishing vessels such as Steel Otter Trawler, Boston Trawler, Salmon Gill Netter, Chesapeake Bay Skipjack, Shrimp Trawler, Pacific Dragger, and Purse Seiner (Tuna).	2.0
a. Navigate different types of vessels.	2.5
b. Understand location where each boat is used.	2.0
c. Understand use of each.	2.0
2. Prepare, maintain and use fishing gear such as fish weir, purse seine, pound net, longline set, gill net, otter trawl, tongs, lobster traps.	2.9
a. Understand use of equipment.	3.4
b. Build, maintain, and repair equipment.	3.4
c. Adjust gear under field conditions for maximum efficiency.	3.2
d. Use other fishing gear such as fishing poles.	1.5
3. Use navigation and communication equipment.	3.1
a. Recognize piloting to navigational markers and signals.	3.6
b. Pilot a boat using navigational charts.	3.2
c. Use dead reckoning.	3.1
d. Use electronic navigation devices.	3.0
e. Use a ship-to-shore and short-wave radio.	3.0
f. Understand national and international rules of the sea.	2.9

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* Responses from 39 Commercial Fisherman in 13 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4.		Tie knots and splices.	3.3
	a.	Tie common knots such as a square knot, a half hitch, bowline, clove, etc.	3.5
	b.	Know how to inspect rope for wear or damage that impairs safe use.	3.4
	c.	Repair nets using appropriate knots and splices.	3.3
	d.	Know rope kinds and sizes and appropriate selection for particular use.	2.9
5.		Be an able seaman.	3.0
	a.	Use safety procedures regarding all aspects of fishing.	3.5
	b.	Use ship machinery such as winches, engines and pumps.	3.3
	c.	Operate machinery under a variety of sea conditions.	3.2
	d.	Be familiar with basic first aid principles.	2.8
	e.	Swim well.	2.2
6.		Understand legal and safe operation of vessels.	3.1
	a.	Maintain a boat in safe condition.	3.2
	b.	Obey fishing regulations in specific areas.	3.1
	c.	Understand Coast Guard rules and regulations.	2.9
7.		Understand fishing laws.	2.8
	a.	Know fishing season for specific species of fish for his area.	3.2
	b.	Know which fish are illegal to catch.	3.0
	c.	Know where polluted non-fishing areas are.	2.4
8.		Recognize species of fish and their habits.	3.0
	a.	Remove undesirable species of fish from catch.	3.2
	b.	Know where desirable fish live.	3.0
	c.	Understand fish schooling and migration.	2.9
9.		Use basic fish preservation techniques.	3.3
	a.	Know use of either refrigeration or ice for preservation techniques.	3.3
	b.	Check for fish quality on long voyage.	3.3
	c.	Maintain proper cooling temperature.	3.2
10.		Use and understand use of various baits.	2.2
	a.	Know which bait is best for certain species of fish.	2.5
	b.	Understand technique of chumming.	1.8
11.		Keep up-to-date with fish marketing information.	2.3
	a.	Understand factors of supply and demand.	2.5
	b.	Check on daily, weekly, and seasonal price lists for fish.	2.4

	c.	Have a knowledge of sources of credit and means of application.	2.3
	d.	Know the government agencies that serve agriculture (USDA, FDA, ICC, PUC, ASCS).	2.0
12.	Keep records of catches.		2.3
	a.	Record where fish are taken.	2.4
	b.	Record types of fish taken.	2.3
	c.	Record poundage of fish taken.	2.3

FISHERIES TECHNICIAN - MARINE

Other Titles: Conservation Helper, Aquatic Biologist, Fisheries Biologist, Fisheries Scientist, Fish Fieldman, Natural Resource Technician I, Fish Management Specialist.

Job Description:

Works with scientists in investigations carried out in salt or brackish water fisheries; collects fish scales and otoliths; takes population surveys; uses tagging procedures; surveys growth beds in sea farms and helps keep predators from beds; assists in the design and construction of fishing gear; assists in preparation and maintenance of algae and mollusk culture studies; assists in construction of collecting gear associated with mariculture operations; uses scuba diving techniques for collection and observation of fish and shellfish.

Competencies Identified and Validated

N = 35*

Competencies	Weighted Mean**
1. Assist scientists in investigations and reports.	3.1
a. Collect samples.	3.3
b. Prepare equipment for experiments.	3.3
c. Conduct population census.	3.1
d. Collect fish scales and otoliths.	2.8
2. Supervise non-professional and field personnel.	3.1
a. Interpret directions and plans.	3.3
b. Enforce employee safety regulations and standards.	2.9
3. Prepare algae and mollusk cultures.	2.0
a. Use proper laboratory procedures in working with sterile equipment for culture media.	2.4
b. Prepare sterile water and chemical nutrients.	1.9
c. Know nutrients required by algae.	1.7

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* Responses from 35 Fisheries Technicians in 13 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4.		Recognize different kinds of shellfish predators (starfish, oyster drill, moonsnail, whelki) and know proper controlling procedures.	1.4
	a.	Remove starfish with starfish mop.	1.4
	b.	Remove predators with quick lense.	1.3
5.		Tag fish and shellfish.	2.8
	a.	Apply tags.	2.8
	b.	Recognize different types of tags.	2.7
6.		Use special nets, seines, dredgers, bottom samplers, and water samplers.	2.7
	a.	Assist in maintenance.	3.1
	b.	Assist in construction.	2.7
	c.	Assist in design.	2.3
7.		Help operate mariculture experiments.	1.9
	a.	Collect matured shellfish.	2.0
	b.	Collect spat.	1.9
	c.	Place shellfish in bed.	1.8
	d.	Fertilize shellfish.	1.7
8.		Use scuba diving equipment.	2.8
	a.	Swim well.	3.0
	b.	Practice safety procedures.	3.0
	c.	Use equipment properly.	2.9
	d.	Recognize different types of scuba equipment.	2.2
9.		Operate small craft.	3.1
	a.	Practice water safety.	3.6
	b.	Maintain equipment.	3.4
	c.	Practice coast guard regulations.	2.3

CAMPGROUND MANAGER

Other Titles: Camp Coordinator, Resident Manager, Superintendent of Parks, Camping Director, Park Maintenance Supervisor.

Job Description:

Supervises the campground maintenance person's weekly work schedule, prepares the weekly camp programs, orders supplies, manages the campground accounts and records, makes periodic reports, schedules camp sites, monitors the safety and health of camp visitors, enforces campground regulations, interprets campground policies and serves as a public relations person for the campground.

Competencies Identified and Validated

N = 32*

Competencies	Weighted Mean**
1. Supervises activities of the campground maintenance person and temporary field personnel.	3.4
a. Interpret directions and plans.	3.7
b. Maintain open communications with employees and administrators.	3.6
c. Enforce employee safety regulations and standards.	3.5
d. Plan and supervise work schedules.	3.5
e. Demonstrate a general understanding of the tasks performed by all employees under his supervision.	3.5
f. Train new personnel.	3.4
g. Interpret appropriate federal, state, and local labor laws.	3.3
h. Maintain working conditions under existing contract agreements.	3.2
2. Schedule the weekly campground activities of visitors and employees.	1.7
a. Prepare daily and long range maintenance plans.	3.0
b. Call in private contractors when necessary.	2.5
c. Provide local entertainment.	1.2
d. Invite guest craftsmen to the camp.	1.2
e. Prepare craft workshops.	1.1

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* Responses from 32 Campground Managers in 20 states. Survey conducted by Department of Agricultural Education. The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	f.	Schedule camp sporting events.	1.1
3.		Order weekly campground supplies.	2.6
	a.	Order parts for camp equipment, including those recommended by the camp maintenance person.	3.0
	b.	Maintain camp food supplies.	2.5
	c.	Maintain camp medical supplies.	2.3
4.		Manage the campground accounts and records and make periodic reports.	2.7
	a.	Keep weekly records of campground money.	3.0
	b.	Account for all campground money.	3.0
	c.	Make periodic reports to the campground owner and discuss camp finances.	2.9
	d.	Handle all incoming money from the campground facilities.	2.8
	e.	Sell the camp visitors overnight stickers.	1.7
5.		Schedule camp site use.	2.8
	a.	Explain the policies of the campground.	3.3
	b.	Check their arrival and departure times.	2.8
	c.	Assign campers to specific camp sites.	2.7
	d.	Give the campers a map of the campgrounds.	2.3
6.		Monitor the safety and health of camp visitors.	2.8
	a.	Use established fire-fighting techniques.	3.2
	b.	Protect the campers from dangerous animals and other hazards.	3.1
	c.	Recognize the need for medical assistance.	3.1
	d.	Be certified to administer first-aid.	2.6
	e.	Recognize certain signs of physical fatigue.	2.0
7.		Enforce campground regulations.	3.1
	a.	Explain camp rules when necessary.	3.4
	b.	Call local or state police for assistance.	3.3
	c.	Direct camp visitors to specific areas.	3.0
	d.	Patrol campground areas.	2.9
8.		Perform public relations work.	2.0
	a.	Explain general program and specific objectives of programs to individuals and groups.	2.7
	b.	Prepare informative reports and other literature for public use.	2.3
	c.	Act as a resource person in program area.	2.0
	d.	Write news releases.	1.7
	e.	Participate in radio and TV programs.	1.2

CAMPGROUND MAINTENANCE PERSON

Other Titles: Parks Worker, Regional Supervisor - Forest and Parks, Park Maintenance Worker I, Park Caretaker, Park Superintendent.

Job Description:

The Campground Maintenance Person has above average skills in the areas of plumbing, electricity, carpentry, and masonry. This person maintains campground buildings and facilities, as well as the turf and forested area around the campground. Small equipment maintenance and repair, swimming pool maintenance, and administering first-aid, are also part of this individual's work.

Competencies Identified and Validated

N = 32*

	Competencies	Weighted Mean**
1.	Maintain and repair the camp water system.	2.7
a.	Recognize any damage to the water system.	3.6
b.	Repair damaged water futures and lines.	3.5
c.	Maintain the water system.	3.3
d.	Call a plumber when the need arises.	2.8
e.	Maintain the camp water pumps.	2.8
f.	Check and control algae growth in the water source.	2.1
g.	Collect water samples for state evaluation monthly.	1.8
h.	Conduct chlorination of drinking water periodically.	1.7
2.	Maintain and repair the camp sewage system.	2.8
a.	Recognize damage or problem in the sewage system.	3.6
b.	Call for assistance when needed.	3.6
c.	Maintain the sewage system.	3.2
d.	Be licensed to operate a treatment plant when applicable.	0.8
3.	Maintain and repair camp structures and follow a scheduled maintenance and repair program.	2.9
a.	Make general repairs.	3.6

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* Responses from 32 Campground Maintenance Persons in 20 states. Survey conducted by Department of Agricultural Education. The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

b.	Paint camp buildings, benches, tables, chairs, signs, and bridges.	3.4
c.	Build new camp buildings, benches, tables, chairs, signs, and bridges.	2.3
d.	Maintain craft and sports equipment.	2.2
4.	Maintain and repair walks, parking areas, roads, and campsites.	2.8
a.	Maintain and repair campsites.	3.3
b.	Make minor repairs to walks, parking areas, and roads.	2.9
c.	Maintain gravel, asphalt, and non-paved roads.	2.8
d.	Mix concrete.	2.6
e.	Pour concrete and finish cement.	2.5
5.	Maintain sanitary conditions.	2.7
a.	Remove rubbish from the campground areas.	3.6
b.	Maintain and disinfect comfort facilities.	3.2
c.	Maintain and clean bath houses.	2.9
d.	Control rodents.	2.8
e.	Apply insecticides to control mosquitos, flies, and ants.	2.7
f.	Be licensed to apply chemicals.	0.8
6.	Mow lawns, open fields, and grassed play areas.	3.0
a.	Use safety standards relating to the operation.	3.3
b.	Become familiar with the operator's manual for each piece of equipment.	3.2
c.	Adjust equipment under field conditions for maximum efficiency.	3.0
d.	Prepare machines and equipment for storage.	3.0
e.	Service mowing machinery and equipment.	2.9
f.	Attach accessory equipment to a basic power unit.	2.8
7.	Repair small equipment.	3.2
a.	Recognize malfunctions in small equipment.	3.4
b.	Make repairs as needed.	3.2
c.	Order replacement parts.	3.2
d.	Recommend major repairs and the need for assistance.	3.2
e.	Recommend acquisitions of new equipment.	3.0
8.	Control and clear weeds including poisonous plants.	2.0
a.	Mow weeds.	2.7
b.	Use a scythe and other brush clearing tool.	2.5
c.	Be licensed to apply herbicides.	1.0

9.		Treat damaged trees and shrubs for insects and diseases.	2.2
	a.	Remove dead trees and limbs.	2.7
	b.	Recognize tree insects, diseases, and their effects.	2.0
	c.	Spray trees for insects and diseases.	2.0
10.		Maintain and repair the camp swimming pool.	1.7
	a.	Check the pool for physical hazards.	2.0
	b.	Recognize any damage to the pool.	1.9
	c.	Use lifesaving equipment.	1.6
	d.	Check the chlorine content of the water.	1.6
	e.	Winterize the pool.	1.5
	f.	Clean the pool daily.	1.5
11.		Monitor safety and health of camp visitors.	2.4
	a.	Recognize the need for medical assistance.	3.0
	b.	Protect the campers from various animals and other hazards.	2.7
	c.	Identify poisonous plants and snakes.	2.5
	d.	Perform artificial respiration.	2.4
	e.	Be certified to administer first-aid.	2.3
	f.	Recognize certain signs of physical fatigue.	2.2
	g.	Organize search parties.	1.4
12.		Use established fire-fighting techniques.	3.3
	a.	Call for assistance.	3.6
	b.	Use an axe, chainsaw, and shovel.	3.5
	c.	Extinguish flames and embers.	3.4
	d.	Suppress fire by felling trees.	2.5

PARK AIDE

Other Titles: Park Worker, Park Groundskeeper, Groundskeeper.

Job Description:

Works directly under the Park Maintenance Person. This person mows the grass, clears weeds, treats trees, and maintains any established existing planting beds. Also, the job includes building and comfort station maintenance, minor repair of park equipment, fire-fighting, enforcing the law, and assisting park visitors.

Competencies Identified and Validated

N = 40*

Competencies		Weighted Mean**
1.	Mow lawns, open fields, and grassed play areas.	3.0
a.	Use safety standards relating to the operation of a particular piece of machinery.	3.4
b.	Recognize malfunctions in equipment.	3.1
c.	Service machinery and equipment according to the operator's manual.	3.0
d.	Become familiar with operator's manual for each piece of equipment.	3.0
e.	Adjust equipment under field conditions for maximum efficiency.	2.9
f.	Attach accessory equipment to basic power unit.	2.8
g.	Prepare machines and equipment for storage.	2.6
2.	Control and clear weeds including poisonous plants.	2.0
a.	Mow weeds.	2.8
b.	Use a scythe and other brush clearing tools.	2.6
c.	Apply herbicides.	2.4
3.	Treat damaged trees and shrubs for insects and disease.	2.4
a.	Remove dead trees and limbs.	2.9
b.	Recognize tree insects and diseases and their effect.	2.2
c.	Spray trees for insects and disease.	2.2

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* Responses from 40 Park Aides in 15 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

4.	Establish and maintain planting beds.	2.0
a.	Mulch plants.	2.1
b.	Dig the soil.	2.0
c.	Prepare the soil for planting.	2.0
d.	Remove dead plants and plant new ones.	2.0
e.	Plant flowers.	1.9
f.	Weed and hoe flowers.	1.8
5.	Cut and maintain trails.	2.9
a.	Remove fallen trees.	3.0
b.	Remove small brush.	3.0
c.	Use chain saw, axe, and brush hook.	2.9
d.	Maintain trail surface.	2.8
6.	Maintain sanitary conditions.	2.9
a.	Maintain and disinfect comfort facilities.	3.3
b.	Remove rubbish from the park areas.	3.2
c.	Maintain and clean bath houses.	3.0
d.	Apply insecticides to control mosquitoes, flies, and ants.	2.2
7.	Maintain and repair benches, tables, chairs, and signs.	2.8
a.	Replace broken parts.	3.0
b.	Paint existing benches, tables, chairs, and signs.	2.9
c.	Use small hand tools.	2.9
d.	Build new benches, tables, chairs, and signs.	2.3
8.	Maintain and repair roads and park walks.	2.6
a.	Sweep walks.	2.7
b.	Patch holes in the roads.	2.7
c.	Clear ditches along roads.	2.6
d.	Clear snow.	2.5
e.	Help build new roads and walks.	2.3
9.	Maintain park water systems.	3.0
a.	Report plumbing problems.	3.5
b.	Recognize plumbing problems.	2.9
c.	Assist in repair of plumbing problems.	2.6
10.	Answer questions and assist visitors.	2.7
a.	Interpret park rules and regulations.	3.1
b.	Direct visitors to points of interest.	3.1
c.	Protect the park from negligent people.	3.1
d.	Enforce park regulations.	2.3
e.	Direct traffic.	2.1

11.	Maintain and repair park buildings.	2.6
	a. Make minor repairs.	3.0
	b. Paint buildings.	2.8
	c. Mix and pour concrete.	2.4
	d. Help build new buildings.	2.1
12.	Use established fire-fighting techniques.	3.3
	a. Report fires.	3.7
	b. Use and maintain fire tools and equipment.	3.2
	c. Apply first-aid techniques.	3.1

PARK MAINTENANCE PERSON

Other Titles: Park Technician, Park Information Technician.

Job Description:

Enforces park rules and regulations as well as interpreting them; directs park registration and assigns camper facilities; maintains the water supplies and facilities, toilet facilities, park buildings, trails, shrubs, and trees, turf areas, and playground equipment; assists campers and constructs certain equipment (tables and benches) as the need arises; administers first-aid, organizes search parties, fire-fighting squads, and supervises the Park Aide or Aides.

Competencies Identified and Validated

N = 47*

Competencies	Weighted Mean**
1. Understand and interpret park rules and regulations.	2.2
a. Assist visitors concerning park rules.	3.0
b. Patrol park grounds.	2.3
c. Enforce park rules.	2.3
d. Call state or local police enforcement agencies.	2.1
e. Direct traffic.	2.0
f. Supervise camper facility assignments.	2.0
2. Monitor safety and health of park visitors.	2.7
a. Recognize hazards to visitors.	3.4
b. Call for medical assistance.	3.0
c. Be certified to administer first-aid.	2.8
d. Perform artificial respiration.	2.7
e. Identify poisonous plants and snakes.	2.6
f. Recognize certain signs of physical fatigue.	2.5
g. Organize search parties.	2.2
3. Maintain and repair park facilities at a sub-journeyman level and follow a scheduled maintenance and repair program.	3.2
a. Maintain and repair water systems.	3.3
b. Maintain and repair sewage systems.	3.3

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* Responses from 47 Park Maintenance Persons in 18 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	c.	Maintain and repair park buildings and comfort facilities.	3.3
	d.	Maintain and repair electrical systems.	3.2
	e.	Maintain trails and walks.	3.1
	f.	Maintain and repair concrete and masonry.	3.0
	g.	Maintain and repair mowing equipment.	3.0
	h.	Maintain grass and trees in the park.	3.0
4.		Supervise the Park Aide(s).	3.1
	a.	Interpret directions and plans.	3.2
	b.	Demonstrate a general understanding of the tasks performed by all employees in this area of work.	3.2
	c.	Enforce department employee safety regulations and standards.	3.1
	d.	Plan and supervise work schedules.	2.9
	e.	Train new personnel.	2.9
	f.	Maintain working conditions under existing contract.	2.9
5.		Use carpentry and masonry skills.	3.0
	a.	Use small hand tools.	3.3
	b.	Use a hammer, saw, power saw, square, and level to construct park structures.	3.2
	c.	Read a blueprint or sketch.	2.8
	d.	Build and repair block structures in the park.	2.6
6.		Organize rubbish removal and park sanitation.	2.9
	a.	Check showers and comfort stations for sanitation.	3.3
	b.	Supervise trash pick-up and disposal.	3.0
	c.	Present basic environmental practices to Park Aide(s) and visitors.	2.6
	d.	Warn campers about litter violations.	2.5
7.		Answer questions pertaining to the park.	2.8
	a.	Answer questions pertaining to the local area.	3.0
	b.	Point out interesting sites within the park.	2.9
	c.	Direct visitors to comfort stations.	2.9
	d.	Direct visitors to natural phenomenon.	2.5

HUNTING AND FISHING GUIDE

Other Titles: Camp Guide, Packer, Outfitter, Hunting Preserve Guide, Professional Guide.

Job Description:

This person is involved in planning and supervising hunting and fishing trips. The guide prepares itineraries, travel routes, equipment, food and provisions. The individual arranges for, and operates motor vehicles and watercraft, or handles horses used during trips. This person understands hunting and fishing laws, firearms use, and tackle and gear equipment needs. The guide selects campsites, prepares meals, and administers first-aid as part of the job.

Competencies Identified and Validated

N = 31*

Competencies	Weighted Mean**
1. Plan hunting and fishing trips.	2.9
a. Organize and lead the hunting or fishing parties.	3.6
b. Select specific areas for hunting or fishing to be done.	3.5
c. Estimate needs and select proper provisions to be used.	3.1
d. Map and plan trip routes.	2.8
e. Obtain proper licenses for members of the party.	2.8
f. Plan trip itineraries.	2.7
g. Arrange for lodging or camping areas.	2.7
h. Plan and provide methods of transportation.	2.6
i. Estimate cost of trips.	2.3
2. Use and understand firearms, gear, tackle, and other equipment used on trips.	3.2
a. Supervise safe use of equipment demonstrating proper safety rules of hunting and fishing.	3.6
b. Recommend the proper equipment to be used for the type of hunting or fishing to be done.	3.4

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* Responses from 31 Hunting and Fishing Guides from 18 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Demonstrate proper use of equipment.	3.1
d.	Make minor repairs on equipment broken on trip.	2.8
3.	Understand state hunting and fishing laws.	3.6
a.	Supervise the taking of proper species, size, and limits of fish and game.	3.8
b.	Keep aware of new law changes.	3.8
c.	Observe and prevent party members from violating laws.	3.6
d.	Explain the proper type of equipment that legally can be used in an area.	3.6
e.	Have a knowledge of public and private lands, and identify types of legal game.	3.6
f.	Inform group on the legality of using dogs, horses, or hunting birds in specific areas.	3.0
4.	Operate water craft and all terrain vehicles.	3.4
a.	Display proper safety habits in operation of craft and vehicles.	3.6
b.	Possess operator's license for all types of craft and vehicles to be used.	3.5
c.	Respect all boating laws.	3.5
d.	Maintain watercraft and vehicles in working order.	3.3
e.	Load all equipment properly.	3.3
f.	Read and interpret maps to obtain bearing or directions.	3.3
g.	Service equipment and make minor adjustments on trip.	3.2
5.	Display basic knowledge of common fish and game animals.	3.0
a.	Identify all species and sexes of desired game animals in area.	3.5
b.	Identify most desired food and habitat of fish and game.	3.1
c.	Display basic understanding of life cycle and mating habits.	2.7
d.	Identify game animals and their predators from tracks and other signs.	2.7
6.	Use pack animals and saddle stock.	2.8
a.	Demonstrate proper handling, care, and management of livestock and related equipment.	3.0
b.	Equip livestock with pack supplies and equipment for travel over all types of terrain.	2.7

7.		Maintain safety and health of the party.	2.8
	a.	Recognize signs of and prevent physical fatigue.	3.2
	b.	Be certified to administer first-aid.	3.1
	c.	Display proper life saving technique in aquatic situations.	3.0
	d.	Identify injuries and sicknesses and treat properly.	2.9
	e.	Display survival methods used on hunting and fishing trips.	2.8
	f.	Organize search parties.	2.5
	g.	Identify proper water and nature edible plants.	2.0
8.		Select and set up campsites.	2.8
	a.	Prepare meals.	2.9
	b.	Select proper sites for placing camps.	2.8
	c.	Set up tents and other shelters.	2.8
9.		Perform public relations work.	2.3
	a.	Explain trip programs and objectives to individuals and groups.	2.8
	b.	Estimate costs and prepare bills.	2.5
	c.	Prepare informative reports and nature talks for public.	1.6
10.		Use correct field dressing and preserving techniques of game.	3.5
	a.	Field dress and preserve game.	3.5

SOIL CONSERVATION AIDE

Other Titles: Conservation Aide, Biological Aide.

Job Description:

The Soil Conservation Aide assists in helping land owners and operators apply soil and water conservation practices, accompanies supervisor to the field and gathers data for development of conservation plans, performs simple work with a farm or hand level in laying out terraces or contour lines. Acts (as Rodman and Chainman) in surveying; from notes approved by supervisor, transposes information to aerial photographs, measures aerial photographs by use of planimeter and makes simple computations, colors land use capability maps and makes simple rough tracings of farm maps for use in preparing finished farm conservation maps, keeps daily records of activities, assists supervisor in working with land owners and operators in planting trees, grass seed, sod or stolons, as assigned, works on preparation and maintenance of accomplishment records and reports for the unit, and performs related duties as assigned.

Competencies Identified and Validated

N = 35*

Competencies	Weighted Mean**
1. Gather field data for farm plans and conservation practices.	2.9
[illegible] Gather drainage area data.	3.4
b. Locate and identify farm and field boundaries.	3.2
c. Make simple sketches.	3.1
d. Record physical and topographical data of farms.	3.1
e. Record acreage in fields by making measurements and talking with landowners.	2.9
f. Interpret basic soil differences.	2.8
g. Determine cropping rotations and systems.	2.6
h. Record the number and type of livestock.	2.1
2. Lay out and inspect routine conservation practices.	3.2
a. Assist in laying out contour strips, grass waterways, diversion terraces, and cropland terraces.	3.5

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* Responses from 35 Soil Conservation Aides in 16 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Check compliance of conservation practices to specifications.	3.4
	c.	Assist and guide equipment operators in installing these routine practices.	3.1
	d.	Make recommendations of acceptability for applied conservation practices.	2.9
3.		Act as a chainman.	3.0
	a.	Mark measuring points with keel, paint, sticks, scratches, tacks, or stakes.	3.3
	b.	Measure distances between survey points, established or to be established, as directed by surveyor.	3.2
	c.	Use steel or cloth tape and surveyor's chain.	3.1
	d.	Cut and clear brush from survey lines.	2.6
4.		Act as a rodman.	3.4
	a.	Hold level rod or stadia rod at designated points.	3.6
	b.	Move rod or target on rod, following hand or verbal signals from instrument man.	3.5
	c.	Call out readings to notekeeper or write station number and reading in notebook when distance is too great from instrument man.	3.4
	d.	Carry and set stakes.	3.2
5.		Assist supervisor in working with landowners in planting trees, grass seed, sod, or stolons.	2.3
	a.	Distinguish between various tree and seed species.	2.6
	b.	Follow planting plan.	2.5
	c.	Use tree planting equipment and tools.	1.7
6.		Make cross-sections and profiles.	3.4
	a.	Measure distances between cross-sections.	3.4
7.		Compute volumes of earth for conservation practices.	2.9
8.		Transpose information from notes to aerial photographs.	3.0
	a.	Transpose approved field notes into map symbols.	3.0
9.		Measure aerial photographs with a planimeter.	3.3
	a.	Measure acreage.	3.4
	b.	Record measurements on photos or in records.	3.4
	c.	Use photo scales.	3.3

10. Make simple rough tracings of farm maps.	3.2
11. Color land use capability maps.	2.4
a. Use color codes of capability maps.	2.6
b. Ink soil survey field sheets.	2.0
12. Help to prepare and maintain accomplishment records and reports.	3.4
a. Prepare daily records of activities.	3.4

SOIL CONSERVATION TECHNICIAN

Other Titles: Land Use Technician, Soil Research Development Technician, Soil Engineering Technician, Roadside Development Technician, Biological Technician.

Job Description:

The Soil Conservation Technician is responsible for follow-up and maintenance activity on previously planned areas; guides and assists land owners and operators in the application and maintenance of conservation and group facility plans in light of changing conditions and serves as followup and maintenance technician on areas previously planned to insure continued compliance; makes simple adjustments in conservation practices when necessary, in accordance with standards set by planning technicians; makes surveys required for planning or application of conservation plans involving the use of hand level and tape; makes observations on the adequacy of applied practices as a result of cooperators' experience; aids land owners in pooling resources in order to establish and maintain conservation practices most efficiently; prepares necessary records and reports on work accomplished; supervises the work of assistants, and performs related duties as assigned. Usually employed by a governmental agency.

Competencies Identified and Validated

N = 31*

Competencies	Weighted Mean**
1. Collect soil samples.	2.8
a. Use an auger or probe and randomly collect core samples.	3.1
b. Complete field data sheet.	2.9
c. Record test pit information for building purposes.	2.5
2. Collect information for the development of farm or ranch conservation plans.	3.3
a. Determine significant erosion hazards and other problems related to the protection of the environment.	3.6
b. Locate and identify farm and field boundaries.	3.5

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* Responses from 31 Soil Conservation Technicians in 20 states. Survey conducted by Department of Agricultural Education. The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

c.	Use topographical and aerial photographs.	3.5
d.	Service referral requests from ASCS.	3.4
e.	Record acreage in field by making measurements and talking with land owners.	3.2
f.	Gather drainage area data for watersheds.	3.2
g.	Record physical and topographical data.	3.1
h.	Determine cropping rotation and systems.	3.0
i.	Record the number and type of livestock.	2.9
3.	Perform preliminary survey and layout work.	3.3
a.	Use hand level or engineering level and tape.	3.7
b.	Determine volumes of earth.	3.6
c.	Study general lay-of-the-land (site conditions).	3.6
d.	Locate best site for engineering practices.	3.5
e.	Measure degree of slope.	3.3
f.	Interpret soils information.	3.3
g.	Evaluate degree of erosion.	3.2
h.	Make borings and vegetative studies of wet areas.	3.1
i.	Procure simple easements.	2.2
4.	Explain or demonstrate methods of applying conservation practices to land owner.	3.0
a.	Adapt conservation practices with modern farming methods.	3.3
b.	Explain the use of various equipment for the installation of practices.	3.2
c.	Differentiate between various seeding and land preparation methods.	3.1
d.	Relate fertilizing techniques and practices.	3.1
e.	Compare contour cultivation with conventional methods.	3.1
f.	Indicate how terracing saves soil and water.	3.1
g.	Show the importance of farm drains and water courses.	3.1
h.	Indicate where tree planting is advisable.	3.0
i.	Translate woodland improvement practices.	2.7
j.	Interpret benefits of seasonal and other simple irrigation practices.	2.6
k.	Compare various range practices.	2.5
5.	Prepare records and reports.	3.1
a.	Keep daily record of work accomplished.	3.7
b.	Maintain farm plan records.	3.2
c.	Assist with annual report.	3.0
d.	Write simple news reports.	3.0
e.	Prepare requisitions.	2.8

6.	Supervise work of assistants.		3.1
	a.	Maintain open communications.	3.4
	b.	Help assistants set-up work schedules.	3.1
	c.	Provide technical information and data.	3.1
	d.	Provide human understanding as a first line supervisor.	3.0
7.	Serve as a follow-through and maintenance technician for established practices.		3.4
	a.	Discuss with land owners the success or failure of established conservation practices.	3.5
	b.	Make field observations of established practices.	3.5
	c.	Make recommendations for the improvement and maintenance of practices.	3.5
	d.	Make simple adjustments to practices when necessary.	3.4
	e.	Aid land owners in pooling resources in order to maintain conservation practices most efficiently.	3.1
8.	Use standard engineering handbooks, guides, designs, and procedures in selecting and adapting practices to fit local conditions.		3.7
	a.	Interpret design specifications and apply them.	3.7
	b.	Keep up-to-date with changing design specifications.	3.7
9.	Prepare land capability maps from soil maps and data.		3.0
	a.	Use soil map symbols.	3.4
	b.	Read and interpret aerial photos.	3.4
	c.	Use soil loss calculator.	2.1
10.	Meet frequently with land owners and operators.		3.3
	a.	Understand the basic crop and livestock practices of the area.	3.6
	b.	Practice basic public relations and human relations techniques.	3.5
	c.	Interpret land owner needs for conservation practices.	3.5
	d.	Evaluate information provided by land owners.	3.4
	e.	Assist in conducting tours.	2.6
11.	Resolve routine working problems.		3.6
	a.	Make decisions based on knowledge and fact.	3.6
	b.	Accept decision-making responsibility.	3.6

WATER TREATMENT PLANT OPERATOR

Other Titles: Water Plant Operator, Superintendent - Water Supply, Assistant Director - Water Operations.

Job Description:

The main task of a Water Treatment Plant Operator is to see that the water discharged from the plant is at the proper level of purification. The individual controls the flow of raw water into plant by starting and regulating operation of electric motors, pumps, and valves. Adds specific amounts of chlorine, florine, ammonia, lime, and/or other chemicals to disinfect, deodorize, and clarify water, or adjust automatic devices which admit chemicals in controlled dosages. Filters impurified water and pumps purified water into water mains. Determines acidity and color of the water through standard color reaction tests. Keeps a daily inspection of the plant, and controls the maintenance of the alarm system in the pumping stations and deep wells; and in the pumps and motors. Keeps written records on such things as health reports, amount of water pumped, and the water level in the wells, and/or reservoirs. A majority of Water Treatment Plant Operators require certification, usually from their state government.

Competencies Identified and Validated

N = 37*

Competencies	Weighted Mean**
1. Monitor chlorinators.	3.3
a. Check chlorinator flow rate.	3.7
b. Take water samples to determine the chlorine and bacteria count.	3.6
c. Record chlorine and water discharge daily.	3.5
d. Check for chlorine gas leaks.	3.5
e. Weigh the daily amount of chlorine used by the chlorinator.	3.3
f. Send water samples to lab for analysis.	3.2
g. Maintain chlorinators.	3.1
h. Maintain booster pumps.	2.6
2. Monitor fluorinators.	2.1
a. Analyze florine content of a water sample using the color comparator.	2.6

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* Responses from 37 Water Treatment Plant Operators in 18 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	b.	Wear a gas mask when adding floride to the solution tank.	2.4
	c.	Record water intake into the fluorinator.	2.1
	d.	Take a reading of the florine in the solution tank.	2.1
	e.	Determine amount of water that enters into the solution tank.	2.0
	f.	Add salt to clean pumps in the fluorinator house.	1.6
3.		Inspect pumping stations.	2.8
	a.	Record oil level of the pump.	3.0
	b.	Record 24 hour changes in pressure and flow meters.	3.0
	c.	Check deep well pumps daily.	2.9
	d.	Determine static water level in the pump.	2.8
	e.	Check pressure systems of booster pumps.	2.6
	f.	Control maintenance of the alarm systems.	2.5
4.		Inspect water tanks.	3.0
	a.	Check 24 hour charts for tank levels.	3.4
	b.	Record flow rate (in gallons per minute).	3.3
	c.	Check water level of tanks, and start auxilliary well if additional water is needed.	3.1
	d.	Check 7 day charts for tank levels.	2.7
	e.	Control maintenance of the alarm system.	2.7
5.		Inspect water reservoirs.	2.5
	a.	Take water sample.	2.9
	b.	Check reservoir for debris and dead animals.	2.6
	c.	Remove debris and dead animals.	2.5
	d.	Locate leaks in the reservoirs.	2.5
	e.	Recommend cleaning of the reservoirs.	2.2
	f.	Check condition of fences.	2.1
6.		Perform maintenance activities.	2.4
	a.	Maintain an overall inspection of the physical plant.	3.2
	b.	Recommend replacement of worn equipment.	3.0
	c.	Maintain and clean building.	2.9
	d.	Change oil in pumps.	2.9
	e.	Grease pumps.	2.9
	f.	Check electrical systems.	2.8
	g.	Maintain lawns, shrubs, and trees.	1.9
	h.	Remove snow during winter months.	1.5
	i.	Resurface roads.	0.9
7.		Locate and repair water mains.	2.5
	a.	Contact fellow workers over two-way radio about possible break.	2.7
	b.	Assist fellow workers in locating and repairing water main breaks.	2.3

WASTE WATER TECHNICIAN

Other Titles: Plant Bacteriologist, Superintendent of Waste Water, Waste Water Plant Operator.

Job Description:

The individual must make practical applications of the basic principles and laws of physics, chemistry, and the biological sciences, including the use of mathematics through analytical geometry, and calculus. Calculates percentages, ratios, and proportions; makes computations in arithmetic for recirculations of sludge from gallons to pounds. Changes 24 hour and weekly charts of integrated figures, and reads meters. Operates the equipment that is associated with the distribution of digested sludge, and keeps in condition odor control equipment. Assists the plant mechanic with repair work. Adjusts manual pumping controls, maintains chlorine application that disinfects sewage as it leaves the plant, and maintains chlorine residue. Works in grit removal, and maintains flow rates.

Competencies Identified and Validated

N = 37*

Competencies		Weighted Mean**
1.	Compute figures on the circulation of sewage.	3.0
a.	Apply parameters as indicated on the daily "Operator's Check List" provided on a shift-by-shift basis by the analyst.	3.3
b.	Calculate percentages, ratios, and proportions.	3.1
c.	Change 24 hour and weekly charts of integrated figures.	3.0
d.	Convert cubic feet into pounds.	2.9
e.	Convert sludge recirculation from gallons to pounds.	2.7
2.	Analyze effluent.	3.2
a.	Take chlorine residual test.	3.5
b.	Take dissolved oxygen tests.	3.3
c.	Determine BOD (Biological Oxygen Demand) of raw water.	3.0
d.	Determine BOD (Biological Oxygen Demand) of discharged water.	2.9

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* Responses from 37 Waste Water Technicians in 19 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.		Perform maintenance activities.	2.1
	a.	Maintain, lubricate, and repair various wastewater treatment plant equipment.	3.2
	b.	Work with preventative maintenance procedures on plant equipment.	3.1
	c.	Safeguard utility services and facilities.	2.6
	d.	Maintain high pressure chlorination which includes piping chlorination and distribution systems.	2.4
	e.	Perform cleaning duties throughout the plant, such as hosing down oil tanks and walk ways.	2.4
	f.	Perform minor electrical repair as required in emergency situations.	2.3
	g.	Calibrate, repair, maintain, and adjust various types of indicating and recording equipment.	2.2
	h.	Maintain adequate inventory of spare parts.	2.2
	i.	Perform general plumbing.	2.2
	j.	Maintain a complete machinery history file on plant equipment which includes a cost breakdown of repairs.	2.2
	k.	Maintain instrumentation in lab.	2.2
	l.	Plan and install various pieces of new equipment.	1.8
	m.	Use both electric and gas welding to repair, maintain, and improve various pieces of plant equipment.	1.6
	n.	Cut grass and maintain trees and shrubs around the plant.	1.6
	o.	Utilize vibration analyzer to diagnose equipment malfunctions not otherwise detectable.	1.5
	p.	Check, adjust, and maintain the recording and integrating instrument used for billing purposes.	1.3
4.		Operate sludge circulation equipment.	2.8
	a.	Check effluent pump operation.	3.3
	b.	Draw sludge from collection hoppers throughout the plant.	3.2
	c.	Adjust flow rate of the sludge recirculation and by-passing.	3.0
	d.	Assist in operation of sludge thickner.	2.8
	e.	Check odor control equipment.	2.7
	f.	Adjust effluent pump rates.	2.6
	g.	Recharge chemical feed tanks on both biological filtration and activated sludge.	2.3
5.		Work with grit removal.	2.7
	a.	Remove grit from collection basins.	3.0
	b.	Haul grit to disposal areas.	2.5

6.	Drive vehicles.	2.0
a.	Drive pick-up truck to secure needed parts and supplies.	2.4
b.	Drive plant tank truck in the distribution of digested sludge.	2.1
c.	Drive snow plow during winter months to clear roads around the plant.	1.4

CONSERVATION AIDE

Other Titles: Jr. Game Biologist, Game Propagator II, Private Shooting Ground Operator and Manager.

Job Description:

Assists in the operation of the game hatchery and general operation of a game farm. Maintains simple roads, trails and ditches on state or federal game lands. Aids wildlife manager or conservation officer in the disposing of nuisance stream obstructions, trapping game animals for experiments, trapping and banding game animals. Assists in maintaining a traveling wildlife exhibit. Plants farm-game habitat improvement plots. Aids in the operation of game animal checking stations during hunting seasons. Serves as a production assistant on state produced wildlife movies. Builds duck blinds on state hunting areas. Performs general building construction, maintenance and repair of buildings. Aids in fire prevention programs and fights fire on game forest lands and game areas. Aids wildlife managers and wildlife biologists in game surveys. Installs boundary fences and signs on game refuge lands. Supervises temporary employees as assigned. Performs preventative maintenance on conservation equipment. Usually employed by a governmental agency.

Competencies Identified and Validated

N = 43*

Competencies	Weighted Mean**
1. Operate game farm and wildlife equipment.	2.9
a. Use safety standards relating to operation of a particular piece of machinery.	3.4
b. Service machinery and equipment according to operator's manual.	3.2
c. Recognize malfunctions in equipment.	3.2
d. Operate machinery and equipment under a variety of field conditions.	3.1
e. Adjust equipment under field conditions for maximum efficiency.	3.0
f. Become familiar with operator's manual for each piece of equipment.	2.9
g. Attach accessory equipment to basic farm power unit.	2.9

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* Responses from 43 Conservation Aides in 19 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

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h.	Prepare machines and equipment for storage.	2.7
i.	Maintain records of maintenance and repair on machinery and equipment.	2.5
j.	Maintain a daily log of number of hours each piece of equipment is used.	2.4
2.	Measure and compute water flow.	1.2
a.	Use stream flow meter.	1.2
b.	Use conversion tables.	1.2
3.	Remove obstructions from ditches and streams.	2.2
a.	Use general earth moving hand tools.	2.5
b.	Operate earth moving equipment.	1.9
4.	Identify wildlife species.	2.7
a.	Identify species of animals.	2.8
b.	Identify species of birds.	2.7
c.	Identify feed plants for animals and birds.	2.7
5.	Assist in maintaining a mobile wildlife exhibit.	2.1
a.	Hold the required license for type of equipment operated.	2.5
b.	Drive responsibly and defensively at all times.	2.4
c.	Protect and secure load.	2.2
d.	Perform minor repairs.	2.1
e.	Maintain a favorable condition for live exhibit.	1.8
f.	Erect or place wildlife exhibit.	1.5
6.	Aid in operation of game animal checking stations during hunting seasons.	3.0
a.	Record location from which wildlife was taken.	3.1
b.	Inquire about numbers, sizes, and species of game animals, game birds, fish, or shellfish taken.	3.0
c.	Measure sizes and make visual checks for other biological data.	3.0
d.	Interview sportsmen at assigned check points.	2.8
7.	Serve as a production assistant on state wildlife movies.	1.5
a.	Perform duties as assigned.	1.6
b.	Maintain wildlife animals.	1.5
8.	Perform general construction maintenance and repair of wildlife facilities.	2.3
a.	Perform subjourneyman level skills in carpentry.	2.6
b.	Clean and sanitize buildings used in wildlife areas.	2.6

	c.	Perform subjourneyman level skills in electricity.	2.0
	d.	Perform subjourneyman level skills in plumbing.	2.0
9.		Aid in fighting game land forest fires.	2.0
	a.	Clear fire lanes by removing brush, trees, and ground litter.	2.1
	b.	Patrol burned area after fire to watch for hot sparks.	2.1
	c.	Suppress fire by felling trees, digging trenches, and extinguishing flames and embers, using axe, chain saw, shovel, and hand or engine driven pumps.	2.0
	d.	Ignite back fires to hasten burnout of major fire.	2.0
	e.	Operate fire-fighting equipment such as bulldozers and fireplows.	1.7
10.		Aid in the gathering and recording of wildlife data.	2.3
	a.	Inventory number and species of wildlife.	2.7
	b.	Inventory available feed for wildlife.	2.5
	c.	Use rain gauge.	1.7
11.		Install boundary fences and signs on state game lands.	2.8
	a.	Use hand tools where necessary to erect fences and signs.	3.1
	b.	Use a prepared map to determine locations.	2.9
	c.	Stretch wire fencing.	2.6
	d.	Operate mechanical equipment to drive posts.	2.5
12.		Supervise temporary employees as assigned.	2.4
	a.	Explain assignments to be done.	2.5
	b.	Assign specific jobs.	2.5
	c.	Evaluate jobs accomplished.	2.2

CONSERVATION OFFICER

Other Titles: Municipal Police Instructor, Game Protector, Game Warden, Waterways Patrolman, Game Conservation Officer, District Game Protector.

Job Description:

Patrols assigned area to prevent game law violations, enforces game laws, investigates reports of damages to crops and property by wildlife. Investigates reports of fish and game law violations and issues warnings and citations. Serves warrants. Makes arrests and prepares and presents evidence in court actions. Collects and reports information on condition of fish and wildlife in their habitat, availability of game food and cover, and suspected pollution of waterways. Recommends stocking procedures, limits seasons, and opening dates. Arranges for the disposition of game killed accidentally or illegally. Interprets fish and game laws, rules, and regulations to sportsmen in the field and addresses group meetings. Promotes and assists in the hunter program. Enlists sportsmen associations in programs such as lake and stream rehabilitation and game habitat improvement. Supervises and advises game feeding and propagation programs. Supervises the maintenance of equipment and buildings within a specific district. Trains workers in the operation of equipment used in district land management programs. Recruits and trains assistant conservation officers and/or labor crews. Maintains an office with complete files in all reports, records, and correspondence applicable to assigned district. Coordinates and enlists leases with land owners for land open to public activities. Conducts an effective predator control program. Usually employed by a state governmental agency.

Competencies Identified and Validated

N = 42*

Competencies	Weighted Mean**
1. Patrol assigned area.	3.8
a. Apprehend violators and take appropriate action.	3.9
b. Prevent game law violations.	3.8
c. Arrest violators.	3.8
2. Prepare cases for prosecution.	3.6

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* Responses from 42 Conservation Officers in 12 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

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	a.	Obtain evidence for legal action.	3.9
	b.	Testify in legal action.	3.8
	c.	Investigate hunting accidents.	3.7
	d.	Understand previous legal cases and their findings.	3.5
	e.	Obtain and serve warrants.	3.5
	f.	Consult a legal opinion.	3.2
3.	Collect and record information on wildlife in the area assigned.		2.7
	a.	Inventory species of wildlife in the assigned area.	2.8
	b.	Determine physical conditions of wildlife.	2.7
	c.	Evaluate wildlife habitat.	2.7
	d.	Take census of wildlife killed in the assigned area.	2.7
	e.	Inventory available feed for wildlife.	2.6
4.	Maintain wildlife population in assigned area.		2.2
	a.	Recommend stocking procedures.	2.5
	b.	Recommend hunting seasons to include limits and opening dates.	2.5
	c.	Recommend maintenance of feeds and habit.	2.2
	d.	Recommend placement of game refuges.	1.6
5.	Dispose of game animals killed accidentally or illegally.		2.6
	a.	Pick up animals to be disposed.	2.8
	b.	Contact companies or organizations to utilize the animal.	2.6
	c.	Recommend placement of animal crossing signs.	2.5
6.	Interpret fish and game laws and rules and regulations.		3.6
	a.	Explain game laws to individuals.	3.7
	b.	Address sportsman's groups.	3.5
	c.	Speak to non-hunting groups.	3.5
7.	Coordinate the hunter safety program.		3.0
	a.	Train hunter safety instructors.	[illegible].2
	b.	Certify persons who have completed hunter safety program.	3.0
	c.	Conduct classes in hunter safety.	2.9
	d.	Distribute hunter safety information.	2.8
8.	Provide public relations for state game commission.		2.7
	a.	Address audience interested in wildlife.	3.2
	b.	Participate in radio and television programs.	2.9
	c.	Maintain exhibits at fairs, sportsman's shows, and schools.	2.8

	d.	Assist sportsman's clubs in lake, stream, and game land improvement.	2.8
	e.	Write newspaper articles for publication.	2.7
	f.	Assist sportsmen in game feeding projects.	2.7
9.		Train deputy game wardens, part-time labor crews, and part-time equipment operators.	2.8
	a.	Conduct new worker orientation.	2.9
	b.	Conduct classes and field experiences for subordinates.	2.9
	c.	Supervise on-job training.	2.8
	d.	Recommend changes in training program.	2.8
	e.	Evaluate training programs.	2.7
10.		Maintain a district office.	3.5
	a.	Communicate with supervisor and clientele.	3.6
	b.	Keep complete files on all reports.	3.5
	c.	Maintain records on all field surveys.	3.3
11.		Obtain leases with land owners for land open to public activities.	2.5
	a.	Maintain farm-game safety zone programs.	2.6
	b.	Distribute game commission signs and posters for farmers.	2.6
	c.	Advise land owners or operators on planting and maintaining game habitats.	2.4
12.		Conduct a wildlife control program.	2.1
	a.	Trap or dispose predatory animals.	2.1
	b.	Trap or move excess game animals to areas where animals are deficient.	2.1
13.		Supervise the wildlife permit system.	1.8
	a.	Issue permits for taxidermists, fur buyers, propagators.	2.0
	b.	Inspect and issue permits for regulated shooting grounds.	1.9
	c.	Issue permits for game land timber sales.	1.4

GAME FARMER

Other Titles: Game Bird Raiser, Game Farm Manager, Wildlife Specialist, Game Propagator, Commercial Game Breeder, Superintendent Game Farmer, Breeder, Shooting Reserve Operator.

Job Description:

Operates a game farm for the selection, propagation, care and feeding, distribution and/or sale of game animals. The typical work includes selecting and marking of foundation stock, operation of incubators, hatchers, brooders, and the operation and maintenance of variety of farm tools and equipment. Feeds and waters birds and cleans their pen and yards. Examines birds to detect signs of illness and innoculates ill birds with antibiotics. Operates and provides preventative maintenance of field tillage, planting, and harvesting equipment. Clips birds wings to keep them in captivity. Trims bills of birds to prevent pecking. Exhibits prize birds at shows. Maintains game range, game farm buildings, and their installed equipment. Mixes feed according to formulas and fills feeding stations. Sets and maintains traps for predatory and noxious animals and birds that may prey upon and carry diseases to charges. Keeps farm records and makes reports. Supervises temporary employees assigned. Patrols the game farm or game refuge area to enforce game laws. Liberates birds and animals in designated areas.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Identify breeds of game birds.	2.8
a. Identify breeds of pheasants.	3.2
b. Identify other breeds of game animals.	2.8
c. Identify breeds of turkeys.	2.6
2. Select breeding stock.	3.4
a. Select individual animals on the basis of size, color, vigor, or other desired characteristics.	3.7
b. Select breeds that are adaptable to that area.	3.1

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* Responses from 30 Game Farmers in 12 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

3.	Select equipment.		3.4
	a.	Select incubators that are adaptable for the species.	3.4
	b.	Select hatchers that are suitable for the species.	3.4
	c.	Select brooders that are suitable for the species.	3.4
4.	Prepare equipment for the incubation of eggs.		3.9
	a.	Sanitize equipment.	3.9
	b.	Adjust equipment to optimum moisture and temperature conditions.	3.8
5.	Collect eggs.		3.6
	a.	Collect eggs at frequent intervals.	3.7
	b.	Collect crack free eggs.	3.5
6.	Incubate eggs.		3.6
	a.	Maintain optimum temperature and moisture conditions.	3.8
	b.	Select eggs that are free from damage.	3.6
	c.	Select fertile eggs of normal size and shape.	3.5
7.	Hatch eggs.		3.6
	a.	Maintain optimum temperature and moisture conditions.	3.9
	b.	Place eggs in hatchers at the proper time.	3.8
	c.	Turn eggs at specific intervals.	3.2
8.	Brood chicks.		3.7
	a.	Place chicks in the brooder area at proper time.	3.8
	b.	Maintain feed and water.	3.8
	c.	Maintain optimum temperature and moisture conditions.	3.6
9.	Raise birds.		3.3
	a.	Maintain adequate water supply.	3.7
	b.	Maintain proper feed ration for optimum growing conditions.	3.6
	c.	Maintain optimum temperature and moisture conditions.	3.2
	d.	Trim bills to prevent pecking.	3.2
	e.	Clip wings to prevent flight from captivity.	3.1

10.	Identify disease symptoms.		3.4
	a.	Recognize clinical diseases.	3.5
	b.	Recognize sub-clinical diseases.	3.3
11.	Treat diseases when observed in flock.		3.6
	a.	Administer antibiotics.	3.8
	b.	Isolate diseased birds if possible.	3.4
12.	Prepare feed ration with percentages of nutrients for optimum growth.		2.5
	a.	Store ration.	2.9
	b.	Calculate percentages of nutrients in feed ration.	2.8
	c.	Grind and mix ration.	2.0
13.	Control waste of feeds.		3.2
	a.	Provide an adequate number of feeders for number of birds.	3.6
	b.	Provide approved feeders.	3.3
	c.	Fill feeders to two-thirds full.	2.8
14.	Control predatory animals.		3.3
	a.	Trap or dispose of predatory animals.	3.3
	b.	Build fences or other screening devices.	3.2
15.	Prepare birds for sale or distribution.		3.4
	a.	Catch birds.	3.5
	b.	Confine birds.	3.4
	c.	Inspect birds.	3.4
16.	Dispose of animals through sale or distribution.		2.5
	a.	Arrange terms of sale.	2.7
	b.	Transport animals to buyers.	2.3
17.	Keep farm records and accounts.		3.0
	a.	Maintain farm records that reflect the financial status of the farm operation.	3.2
	b.	Maintain financial records that reflect actual cost of producing each flock.	3.0
	c.	Maintain feed records on each group of birds that list the amount of feed utilized per bird.	2.8
18.	Evaluate production procedures.		3.0
	a.	Calculate the percentage of livability.	3.2
	b.	Determine the overall cost per bird for the farm operation.	3.1
	c.	Determine the profit or loss for the farm operation.	3.1

	d. Calculate the feed conversion factors.	2.8
	e. Determine the cost of feed per bird for each group.	2.6
19.	Operate game farm and wildlife equipment.	3.0
	a. Service machinery and equipment according to operator's manual.	3.3
	b. Use safety standards relating to operation of a particular piece of machinery.	3.3
	c. Recognize malfunctions of equipment.	3.3
	d. Adjust equipment under field conditions for maximum efficiency.	3.1
	e. Become familiar with operator's manual for each piece of equipment.	3.0
	f. Operate machinery and equipment under a variety of field conditions.	3.0
	g. Attach accessory equipment to basic farm power unit.	2.9
	h. Prepare machines and equipment for storage.	2.9
	i. Maintain records of maintenance and repair on machinery and equipment.	2.8
	j. Maintain a daily log of number of hours each piece of equipment is used.	2.4
20.	Provide preventative maintenance for farm equipment including trucks.	3.1
	a. Lubricate equipment.	3.3
	b. Replace worn parts.	3.3
	c. Sharpen equipment.	3.2
	d. Adjust equipment.	3.2
	e. Clean equipment.	3.1
	f. Perform noncritical welding.	2.7
21.	Provide maintenance for farm buildings by performing subjourneyman tasks in:	2.8
	a. Carpentry.	2.9
	b. Plumbing.	2.8
	c. Painting.	2.8
	d. Electricity.	2.8
22.	Assist in the enforcement of game laws during peak periods of hunter activity.	2.7
	a. Explain local hunting restrictions.	2.8
	b. Refer game law violations to supervisors.	2.7
	c. Patrol assigned area.	2.5
23.	Supervise temporary employees assigned to the farm.	3.2
	a. Interpret directions.	3.4
	b. Train new personnel.	3.2
	c. Plan and administer work schedules.	3.1

WILDLIFE TECHNICIAN

Other Titles: Game Technical Aide, Natural
Resources Technician - Wildlife, Wildlife
Biologist, Game Biologist.

Job Description:

Assists in a variety of management activities and performs technical field work in game and wildlife habitat investigations, and studies; surveys, artificial and natural game propagation and rearing, wildlife habitat improvement, population, and wild animal damage control, game population census, census of hunting and trapping harvest; aids construction, maintenance, and repair of buildings, facilities used in breeding, hatching, feeding, and treating diseases of artificially raised game birds. Traps, cares for, transports and displays wild game animals and birds. Captures and prepares samples of water, food, and soils for chemical analysis. Conducts analytical tests to determine nutrient value and the presence of extraneous pesticide chemicals in wildlife species. Uses special equipment to follow movements of individual animals. Summarizes data and writes technical reports. Assists in the location, development and operation of controlled hunting areas. Assists with game conservation education in area assigned. Supervises nonprofessional and temporary field personnel. Aids in the location and the establishment of boundary markers for state game lands and game preserves. Assists in the enforcement of game laws during peak periods of sports activity. Usually employed by a governmental agency.

Competencies Identified and Validated

N = 30*

Competencies	Weighted Mean**
1. Supervise operation of equipment and facilities for plant life projects as assigned.	2.7
a. Make recommendations for food, cover, planting, etc.	3.7
b. Provide technical assistance in tree and shrub planting.	3.0
c. Interpret and apply directions and/or specifications.	2.8
d. Supervise preparation of seed beds.	2.1

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* Responses from 30 Wildlife Technicians in 11 states. Survey conducted by Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania 16802.

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2.		Collect and record information on wildlife in a specific area.	3.4
	a.	Inventory species of wildlife in specific area.	3.7
	b.	Take census of wildlife killed in specific areas.	3.7
	c.	Inventory available feed for wildlife.	3.5
	d.	Determine the balance of animals to food supply.	3.4
	e.	Evaluate wildlife habitat.	3.2
	f.	Determine physical condition of wildlife.	3.0
3.		Capture and mark wild animals.	3.0
	a.	Trap or immobilize wild animals.	3.2
	b.	Mark wild animals using coloring, marking, or tagging techniques.	3.2
	c.	Use radio tracking devices.	2.7
4.		Aid in the construction, maintenance, and repair of buildings.	1.8
	a.	Perform sub-journeyman skills in carpentry.	1.9
	b.	Perform sub-journeyman skills in electricity.	1.7
	c.	Perform sub-journeyman skills in plumbing.	1.7
5.		Gather samples of water, food, and soil.	2.2
	a.	Gather representative samples.	2.3
	b.	Prevent contamination of samples.	2.3
	c.	Select possible areas to sample.	2.2
6.		Conduct simple analytical tests.	1.5
	a.	Analyze water samples for pH and pesticide residues.	1.7
	b.	Analyze soil samples for pH and pesticide residues.	1.4
	c.	Analyze food samples for pesticide residues.	1.3
7.		Transport game animals.	3.0
	a.	Hold the required license for operating equipment.	3.0
	b.	Use appropriate restraining methods to prevent injury to animals.	3.0
8.		Use radio tracking methods.	2.6
	a.	Fit equipment to animals.	2.9
	b.	Trace animal range area.	2.9
	c.	Record, read, and interpret data.	2.8
	d.	Determine appropriate equipment to be used.	2.0
9.		Operate equipment.	2.9
	a.	Operate and maintain equipment safely.	3.4
	b.	Perform preventative maintenance.	3.0

	c.	Maintain daily log of number of hours of operation.	3.0
	d.	Adjust implements for maximum efficiency and safety.	2.9
	e.	Perform necessary field repairs.	2.7
	f.	Obtain necessary licenses.	2.6
10.		Assist in the development and operation of controlled wildlife areas.	2.7
	a.	Identify wildlife species, wildlife food, and cover crops.	3.1
	b.	Inventory animal population.	3.0
	c.	Conduct public relations functions with users.	3.0
	d.	Keep records on daily kill and census.	2.8
	e.	Project the number of licenses to be issued in accordance with maintaining wildlife balance.	2.0
	f.	Identify disease symptoms and administers antibiotics.	1.7
11.		Assist professional personnel with wildlife education.	2.4
	a.	Explain wildlife objectives to individuals and groups.	2.9
	b.	Prepare literature for the public.	2.1
	c.	Prepare in-service material for wildlife non-professional personnel.	2.1
12.		Supervise non-professional and temporary field personnel.	2.8
	a.	Interpret directions.	2.9
	b.	Plan and administer work schedules.	2.8
	c.	Train new personnel.	2.8
13.		Locate and establish boundaries for game land and game preserves.	2.3
	a.	Plot data on existing maps.	2.4
	b.	Interpret and use aerial photographs, topographic maps to aid in identifying areas and boundaries.	2.3
	c.	Make maps.	2.1
14.		Assist in the enforcement of game laws during peak periods of hunter activity.	2.5
	a.	Explain local hunting restrictions.	2.8
	b.	Refer game law violations observed to supervisors.	2.7
	c.	Patrol assigned area.	1.7

FORESTRY

In many parts of the United States climatic conditions are ideal for growing forest trees. Thousands of persons are employed in harvesting and processing trees into lumber and other essential products. The occupations surveyed in Forestry in this study follow.

Occupation Cluster/Occupations		Page
Forest Production, Logging, Harvesting	Forestry Aide	540
	Logging Skidder Operator	546
	Wood Producer	550
Primary Wood Processing	Sawyer	556
	Sawmill Worker	559
Forest Protection	Forest Fire Ranger	565
	Forest Fire Fighter	568
	Forest Insect Ranger	570
	Smoke Jumper	572
	Fire Warden	574
	Forest Fire Suppression, Crew Leader	576
Special Products	Christmas Tree Farmer	578
	Maple Syrup Producer	582

FORESTRY AIDE

Other Titles: Timber Cruiser, Tree Planter, Compassman, Timber Marker.

Job Description:

The Forestry Aide is a trained person who assists professional foresters in planning and executing forestry projects on public and private lands. Unlike the forest technician, however, the aide usually is not as highly trained in forestry practices. Duties and responsibilities of a forestry aide may increase, however, over a period of several years until the aide may be performing many of the duties of a professional forester. Most forestry aides perform the following duties: assisting foresters in managing timber stands, assisting foresters in conducting land surveys, performing conservation and reforestation duties, preventing and controlling forest fires, and operating and maintaining equipment.

Competencies Identified and Validated

N = 51*

	Competencies	Weighted Mean**
1.	Assist forester in managing forest properties.	2.4
a.	Measure distance between sample plots.	3.4
b.	Record number of trees by species.	3.3
c.	Assist forester in marking timber to be removed for thinning.	3.2
d.	Use compass to direct cruising operations.	3.2
e.	Assist controlled burning operations.	3.0
f.	Measure tree height using Abney level.	3.0
g.	Measure tree diameter at breast height (DBH) using diameter tape.	2.9
h.	Mark insect and disease damaged trees for salvage.	2.9
i.	Recognize insect and disease damage.	2.9
j.	Mark undesirable trees to be cut and harvested.	2.8
k.	Measure growth rate using increment borer.	2.6
l.	Measure DBH using cruiser's stick.	2.6
m.	Measure basal area using wedge prism.	2.5
n.	Remove undesirable trees by use of herbicide injectors.	2.5

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* Responses from 51 Forestry Personnel in 5 states. Study conducted by Department of Agricultural and Extension Education, Mississippi State University, Mississippi State, Mississippi 39762.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

o.	Lay out sample plots.	2.4
p.	Calculate volume of sawlogs using Doyle scale.	2.4
q.	Record volume of individual trees using tally sheet method.	[illegible].4
r.	Act as flagman for aerial spraying.	2.3
s.	Measure tree height using cruisers stick.	2.3
t.	Calculate volume of pulpwood.	2.2
u.	Remove undesirable trees by girdling.	2.2
v.	Use ground equipment to spray for insect control.	2.2
w.	Interpret aerial photographs to identify forest cover types, classes, and areas.	2.1
x.	Assist in building and repairing bridges.	2.0
y.	Maintain drainage systems (culverts, ditches, etc.).	2.0
z.	Install culverts and drains.	2.0
aa.	Calculate volume of sawlogs using Scribner scale.	1.7
bb.	Establish logging roads using bulldozer, motorgrader, etc.	1.7
cc.	Calculate volume of sawlogs using International scale.	1.6
dd.	Grade and level existing logging roads.	1.5
ee.	Prune trees to improve timber stand.	.8
2.	Assist in conducting surveys and measuring and marking boundaries.	2.3
a.	Mark boundaries and corners using paint.	3.9
b.	Make linear measurements by using surveyor's chain.	3.0
c.	Make linear measurements by pacing.	2.9
d.	Mark boundaries and corners by using tree blazes.	2.8
e.	Use compass to maintain direction of survey.	2.7
f.	Clear brush for surveying team.	2.5
g.	Transport instrument for surveyors.	2.0
h.	Carry and hold surveyor's rod.	1.8
i.	Use surveying instrument to determine boundaries.	1.6
j.	Set up instrument for surveyor.	1.5
k.	Use surveying instrument to determine elevation.	1.2
l.	Calculate area measured.	1.1
3.	Perform conservation and reforestation duties.	2.6
a.	Keep records of trees planted, area covered, time spent.	3.2
b.	Direct planting crew.	3.1
c.	Plant trees using mechanical planter.	3.1
d.	Transport and care for seedling from nursery to planting site.	3.1

	e.	Plant tree seedlings using hand tools (planting bar, tree planting hoe, mattock, etc.).	3.0
	f.	Prepare planting site by use of herbicides.	2.3
	g.	Assist aerial direct-seeding operations by serving as flagman.	2.2
	h.	Plant trees by direct seeding using ground equipment.	2.2
	i.	Collect cones and/or seeds from trees.	2.1
	j.	Prepare planting site by plowing or disking.	2.1
4.		Prevent and control forest fires.	2.6
	a.	Use maps to locate access roads and trails.	3.1
	b.	Backfire to consume material.	3.0
	c.	Extinguish remaining fire spots after main fire is under control (mop-up operations).	2.9
	d.	Transport men and equipment to fire.	2.8
	e.	Establish fireline with tractor and plow.	2.8
	f.	Use swatter, rakes, and/or shovel to fight fire directly.	2.7
	g.	Establish fireline using hand tools.	2.6
	h.	Record fire crew time.	2.6
	i.	Use maps to locate fires and report position.	2.6
	j.	Repair and service equipment after the fire.	2.5
	k.	Submit fire reports.	2.3
	l.	Use backpack pump to fight fire directly.	2.3
	m.	Coordinate fire fight from aircraft.	1.4
5.		Help enforce rules and regulations.	1.8
	a.	Enforce safety rules and regulations.	2.8
	b.	Enforce trespassing regulations.	2.2
	c.	Enforce public institution regulations.	1.7
	d.	Enforce traffic rules and regulations.	1.4
	e.	Enforce camping and hiking regulations.	1.4
	f.	Enforce game and fish regulations.	1.3
6.		Operate and maintain tools and equipment.	2.3
	a.	Operate trucks. (1) Transport equipment and materials. (2) Haul crew members to work locations.	3.1
	b.	Maintain trucks and cars. (1) Maintain engine oil level, coolant level on a daily basis. (2) Maintain tire air pressure. (3) Maintain battery electrolyte level, battery terminals, and cables. (4) Clean exterior of vehicle and cab. (5) Service or replace air cleaner.	2.5

   (6) Change engine oil and oil filter using proper oil and replacement filter at periodic intervals.
   (7) Clean and adjust spark plugs.
   (8) Replace spark plugs.
   (9) Replace ignition points.
   (10) File and regap ignition points.
c. Operate bulldozer or other tractor. 2.4
   (1) Attach implements to crawler or tractor.
   (2) Plow firelanes.
   (3) Load and secure on truck for transport.
   (4) Pull mechanical tree planter.
   (5) Plow with disk for site preparation for planting.
   (6) Clear brush and shrubs from planting area.
   (7) Grade and level roads.
d. Maintain fire fighting equipment. 2.4
   (1) Clean fireplow and protect against rust.
   (2) Replace fireplow points.
   (3) Replace pump gaskets or washers.
   (4) Lubricate backpack pump.
   (5) Repair swatters.
   (6) Clean firehose, shovels, and rakes.
   (7) Clean backpack pump externally and internally.
e. Operate chain saw. 2.2
   (1) Mix fuel and oil in proper proportion.
   (2) Fell trees.
   (3) Clear underbrush.
   (4) Buck trees.
   (5) Limb trees.
f. Maintain crawler or other tractor. 2.1
   (1) Maintain engine oil level, radiator level, fuel level, hydraulic oil level, and transmission oil level on a daily basis.
   (2) Maintain battery electrolyte level, battery terminals, and clamps as needed.
   (3) Fill cooling system with antifreeze to maintain recommended freezing point.
   (4) Maintain brake fluid level.
   (5) Service or replace air cleaner on periodic basis.
   (6) Adjust track tension (if applicable).
   (7) Change engine oil and oil filters using proper oil and replacement filter at recommended intervals.
   (8) Lubricate all grease fittings using proper grease at periodic intervals.

(9) Maintain fan belt tension.
(10) Replace ruptured external hydraulic lines.
(11) Change fuel filters at periodic intervals.
(12) Repair or replace cables and wire rope.
(13) Clean tractor with steam cleaner or water hose.
(14) Flush coolant system.
(15) Adjust clutch (if applicable).
(16) Adjust brakes.
(17) Remove air from diesel fuel lines.
(18) Perform minor welding repairs using electrical or oxygen acetylene welding equipment.
(19) Repaint tractor.
(20) Replace brake shoes or pads.
(21) Adjust diesel injectors.
(22) Time diesel injection.

g. Maintain chain saws. 1.8
(1) Sharpen chain.
(2) Clean and regap spark plug.
(3) Adjust chain for proper tension.
(4) Clean saw and prepare for storage.
(5) Replace chain sprocket as needed.
(6) Replace bows or bars.
(7) Replace broken chain links.
(8) Clean and service carburetor air cleaner.
(9) Replace chain clutch as needed.
(10) Replace ignition points.
(11) Adjust carburetor for maximum efficiency.

7. Develop positive attitudes toward work and fellow workers. 3.6

a. Remain safety conscious of other workers. 3.9
b. Cooperate with fellow employees. 3.8
c. Accept responsibility for own actions. 3.8
d. Listen carefully to daily work instructions. 3.8
e. Report to work on time and ready to work. 3.8
f. Accept responsibility for equipment used. 3.7
g. Use proper safety equipment and dress. 3.7
h. Show a positive, optimistic attitude toward work in general and fellow workers. 3.7
i. Demonstrate a willingness to learn new skills and to improve old skills. 3.7
j. Show mature judgement on the job. 3.6
k. Recognize own importance to the operation. 3.5
l. Show tact in dealing with others. 3.5
m. Show initiative in daily work. 3.5

n.	Demonstrate an ability to adjust to changes in general work routine.	3.4
o.	Accept criticism in a constructive manner.	3.4
p.	Know his own abilities and limitations.	3.2

LOGGING SKIDDER OPERATOR

Other Titles: Logging Tractor Operator.

Job Description:

Operates rubber tired or crawler tractor equipped with one or more accessories, such as bulldozer blade, grapple, logging arch, cable winches, hoisting rack, and crane boom, to skid, load, unload, or stack logs, pull stumps, or clear brush. May build or repair logging and skidding roads or trails. May use skidder to pull stalled trucks or other equipment to solid ground and push or plow firelanes. Attaches choking cables or chains to logs and skids to loader landing. Deposit logs in a manner to facilitate loading operations. Performs preventative and general maintenance on skidder.

Competencies Identified and Validated

N = 31*

Competencies	Weighted Mean**
1. Operate skidder.	2.2
a. Recognize malfunctions in skidder operation.	3.6
b. Operate winch to skid logs, or pull stalled vehicles.	3.6
c. Choose appropriate gear and speed for safe, efficient operation.	3.6
d. Attach cable or chain chokers to logs.	3.5
e. Pull stalled vehicles to solid ground.	3.4
f. Establish skidding roads and trails.	3.3
g. Establish landing area for logs.	3.2
h. Load and secure skidder on trailer for transport.	3.1
i. Match skidder capacity to number and weight of logs.	3.1
j. Maintain skidding roads and trails.	2.4
k. Establish ditches and drains for wet areas.	2.2
l. Attach implements to skidder.	2.0
m. Operate skidder on highway to transport.	2.0
n. Use hydraulic grapple to skid logs.	1.7
o. Adjust fairlead for various loads.	1.5
p. Pile brush or tops for cleanup.	1.2
q. Push firelanes.	0.7

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* Responses from 31 Logging Skidder Operators in 5 states. Survey conducted by Department of Agricultural and Extension Education, Mississippi State University, Mississippi State, Mississippi 39762.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

r.	Pull fire plow.	0.1
s.	Pull disk plow.	0.1
t.	Pull tree planter.	0.1
2.	Perform preventative maintenance.	3.0
a.	Perform bi-weekly maintenance (100 hours).	3.1
(1)	Change engine oil and filter.	
(2)	Replace fuel filters.	
(3)	Lubricate all grease fittings not previously listed.	
(4)	Maintain belt tension.	
(5)	Drain dirt and water from fuel tank.	
b.	Perform daily maintenance (10 hours).	3.3
(1)	Maintain engine oil level.	
(2)	Maintain hydraulic oil level.	
(3)	Inspect instruments for normal operation.	
(4)	Maintain coolant level.	
(5)	Fill fuel tank.	
(6)	Lubricate universal joints and drive shaft slip joints.	
(7)	Lubricate trunnion pins.	
(8)	Clean leaves, twigs, or branches from skidder.	
(9)	Inspect hydraulic system for visible leaks.	
(10)	Maintain tire air pressure.	
(11)	Maintain battery electrolyte level.	
(12)	Drain fuel filters.	
(13)	Inspect tires for cuts or scrapes.	
c.	Perform weekly maintenance (50 hours).	3.0
(1)	Maintain transmission fluid level.	
(2)	Maintain oil level in transmission differential.	
(3)	Maintain oil level in planetary drives.	
(4)	Maintain oil level in winch housing.	
(5)	Lubricate dozer blade trunnions.	
(6)	Maintain brake fluid level in master cylinder.	
(7)	Maintain oil level in PTO differential.	
(8)	Clean transmission breather.	
d.	Perform quarterly maintenance (600 hours).	2.5
(1)	Replace or clean air filter element.	
(2)	Clean radiator externally.	
(3)	Drain and refill hydraulic system, replacing filters.	

(4)	Change oil in winch housing.	
(5)	Drain and flush fuel tank.	
e.	Perform semi-annual maintenance (1,200 hours).	2.4
(1)	Clean entire machine using high pressure hose.	
(2)	Drain and refill transmission replacing filters.	
(3)	Clean machine using steam cleaner.	
(4)	Drain and flush cooling system.	
(5)	Drain and refill differentials and planetary hubs.	
3.	Perform general maintenance.	2.1
a.	Fill coolant system with anti-freeze coolant to maintain recommended freeze protection.	3.1
b.	Replace wire rope on winch.	3.0
c.	Replace ruptured external hydraulic lines.	3.0
d.	Read and follow directions in operator's manual.	2.9
e.	Select appropriate oils and greases.	2.8
f.	Replace broken or worn universal joints.	2.7
g.	Place battery on electrical charger.	2.7
h.	Repair ruptured external hydraulic lines.	2.7
i.	Replace coolant water hoses.	2.6
j.	Install new chokers.	2.6
k.	Replace generator or alternator as provided.	2.5
l.	Maintain records of maintenance.	2.4
m.	Use booster cables to start skidder.	2.4
n.	Bleed air from diesel fuel system.	2.4
o.	Clean battery cables and terminals.	2.3
p.	Remove tires for repair or replacement.	2.2
q.	Install ferrules on winch lines and chokers.	2.0
r.	Lubricate wire rope.	2.0
s.	Adjust clutches if applicable.	2.0
t.	Replace electrical starting motor.	1.9
u.	Adjust brakes.	1.9
v.	Adjust steering controls.	1.8
w.	Bleed air from hydraulic braking system.	1.8
x.	Replace exhaust system parts.	1.8
y.	Adjust power shift transmission if applicable.	1.3
z.	Adjust diesel injectors if applicable.	1.3
aa.	Replace brake shoes or pads.	1.3
bb.	Perform welding repairs using electric welder.	1.2
cc.	Splice wire rope.	1.2
dd.	Perform welding repairs using oxygen-acetylene torch.	1.0
ee.	Replace burned-out or broken light bulbs.	0.9

4.	Operate other machinery.	2.0
a.	Operate chain saw to limb trees.	2.4
b.	Operate chain saw to buck trees.	2.4
c.	Operate bulldozer to establish skidding. and logging roads and trails.	2.3
d.	Operate bulldozer to maintain skidding and logging roads and trails.	2.3
e.	Operate chain saw to fell trees.	2.3
f.	Operate truck to transport workers.	2.3
g.	Operate knuckle-boom loader.	2.1
h.	Operate truck to haul timber.	1.9
i.	Operate truck to haul skidder.	1.9
j.	Operate motor grader.	0.2
5.	Develop positive attitudes toward work and fellow workers.	3.3
a.	Remain safety conscious of other workers at all times.	3.7
b.	Recognize his own importance to the operation.	3.5
c.	Report to work on time and ready to work.	3.5
d.	Listen carefully to daily work instructions.	3.4
e.	Cooperate with fellow employees.	3.4
f.	Show mature judgment on the job.	3.4
g.	Use proper safety equipment and dress.	3.4
h.	Accept responsibility for equipment he uses.	3.4
i.	Accept responsibility for his own actions.	3.3
j.	Know his own abilities and limitations.	3.3
k.	Demonstrate a willingness to learn new skills and to improve old skills.	3.3
l.	Show tact in dealing with others.	3.2
m.	Demonstrate an ability to adjust to changes in general work routine.	3.1
n.	Show initiative in daily work.	3.1
o.	Accept criticism in a constructive manner.	3.0
p.	Show a positive optimistic attitude toward work in general and fellow workers.	2.6

WOOD PRODUCER

Other Titles: Logging Foreman, Logging Contractor.

Job Description:

The Wood Producer is the key person in timber procurement. The primary duty of the producer is to bring timber, men, and machinery together at the right time and in the right place. To accomplish this primary duty the wood producer must perform the following duties: procuring timber for harvesting, handling business aspects of logging, supervising workers, managing harvesting operations, and operating and maintaining equipment.

Competencies Identified and Validated

N = 32*

Competencies	Weighted Mean**
1. Procure timber for harvesting.	2.1
a. Locate public and private roads and trails to be used in hauling.	3.3
b. Obtain right-of-way for crossing third-party property.	3.3
c. Determine boundaries and corners by visual inspection.	3.2
d. Execute contract with owner on basis of timber removed.	3.0
e. Calculate volume of stand in terms of board feet and/or cords.	3.0
f. Submit bids on timber offered for sale.	2.5
g. Execute contract on basis of lump-sum payment.	2.5
h. Evaluate cruiser's report.	2.4
i. Select trees to be thinned for timber stand improvement.	2.4
j. Determine boundaries and corners by surveying.	1.8
k. Measure tree diameter using diameter tape.	1.5
l. Measure tree diameter using cruiser's stick.	1.5
m. Measure and mark sample plots for cruising.	1.4
n. Interpret aerial photographs to identify cover types, forest classes, and areas.	1.4
o. Measure tree height using cruiser's stick.	1.4

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* Responses from 32 Wood Producers in 5 states. Study conducted by Department of Agricultural and Extension Education, Mississippi State University, Mississippi State 39762.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	p.	Measure tree height using Abney level.	0.3
2.	Handle business aspects of logging.		2.9
	a.	Maintain records of income.	3.5
	b.	Maintain records of expenses.	3.2
	c.	Maintain records of payments to timber owners.	3.2
	d.	Maintain records of timber cut.	3.1
	e.	Maintain adequate insurance for equipment and workers.	3.1
	f.	Maintain records of workers' time and pay.	2.9
	g.	Prepare tax reports.	2.8
	h.	Maintain records of worker-related accidents.	2.8
	i.	Maintain records of machinery maintenance.	2.6
	j.	Maintain records of equipment depreciation.	2.5
	k.	Use records for making decisions on equipment purchase, timber purchase, etc.	2.5
3.	Supervise worker.		2.7
	a.	Train workers in using chain saw.	3.2
	b.	Train workers in using skidder.	3.1
	c.	Show mature judgement.	3.1
	d.	Train workers in using trucks and trailers.	3.0
	e.	Give instructions and explanations for days work.	3.0
	f.	Terminate workers with unsatisfactory work performance.	3.0
	g.	Organize crew for continuous work.	3.0
	h.	Supervise maintenance of equipment.	2.9
	i.	Train workers in using knuckle-boom loader.	2.9
	j.	Show tact and patience in dealing with crew members.	2.8
	k.	Remain with crew as much as possible.	2.8
	l.	Set and enforce standards of behavior.	2.7
	m.	Give criticism in a constructive manner.	2.7
	n.	Provide safety equipment and training.	2.6
	o.	Interview potential workers.	2.6
	p.	Set a daily or weekly production goal.	2.5
	q.	Hire new workers.	2.4
	r.	Train workers in using "Big Stick" loader.	2.4
	s.	Recruit potential workers.	2.3
	t.	Encourage friendly competition.	2.3
	u.	Work as a supervisor rather than a worker.	1.6
4.	Manage harvesting operations.		2.8
	a.	Cut timber to mill specifications.	3.7
	b.	Plan work with regard to weather conditions.	3.4
	c.	Avoid damage to timber not marked for cutting.	3.3
	d.	Build roads for efficient hauling.	3.1
	e.	Maintain existing roads.	3.1

f. Cut tract according to a systematic plan. 3.0
g. Provide for extra equipment, tools, parts, and/or supplies for replacement or repair in the field. 3.0
h. Establish a landing area for loading. 2.8
i. Build bridges. 2.6
j. Plan harvesting to give a minimum of disturbance of the local ecology. 2.4
k. Install culverts. 2.2
l. Install drainage ditches. 2.2
m. Maintain drainage ditches. 1.8

5. Operate equipment. 2.5

a. Operate chain saw. 3.9

(1) Mix fuel and oil in proper proportions.
(2) Maintain automatic-oiler oil level.
(3) Fell tree in a safe efficient manner.
(4) Oil chain using manual oiler.
(5) Plan escape routes before cutting.
(6) Observe position of crew members before felling.
(7) De-limb trees.
(8) Wear proper safety apparel (hard hat, gloves, goggles, leggings, etc.).
(9) Fell trees to facilitate loading or skidding.
(10) Buck trees into standard lengths.
(11) Clear cutting area of underbrush before cutting.
(12) Mark trees for bucking.

b. Operate skidder. 2.8

(1) Deposit logs in a pile which will facilitate loading.
(2) Operate winch to skid logs.
(3) Recognize malfunctions in skidder operations.
(4) Match skidder capacity to number and weight of logs.
(5) Choose appropriate gear and speed for safe, efficient operation.
(6) Choke logs with cable or chain.
(7) Attach implements to skidder.

c. Operate "Big Stick" loader. 1.7

(1) Operate winch.
(2) Balance and stack logs or bolts.

d. Operate knuckle-boom loader. 2.5

(1) Stack and balance load.
(2) Load logs onto truck.
(3) Transport loader to landing and set-up for loading.

e. Operate trucks. 2.6

(1) Bind load with chains or cable.
(2) Transport to mill or woodyard.
(3) Keep records of amount of wood delivered.
(4) Supervise loading.
(5) Attach trailers or semi-trailers.

f. Operate other equipment. 1.1

(1) Electric welder.
(2) Oxygen-acetylene torch.
(3) Battery charger.
(4) Air compressor.
(5) Steam cleaner.
(6) High pressure washer.

6. Maintain equipment. 2.3

a. Maintain chain saws. 2.6

(1) Sharpen blade using file and guide.
(2) Adjust chain tension.
(3) Repair chain links.
(4) Recognize malfunctions in blade cutting action.
(5) Replace chain, sprocket, clutch, and bars or bows as needed.
(6) Clean and service air cleaner.
(7) Clean saw of dust, dirt, or grease at periodic intervals.
(8) Rotate cutter bar for uniform wear.
(9) Clean and/or replace fuel strainer.
(10) Adjust idle speed carburetor screw.
(11) Adjust high speed carburetor screw.
(12) Replace or repair rewind starters.
(13) Clean and gap spark plug.
(14) Check and tighten fasteners daily.
(15) Install ignition breaker points.
(16) Replace carburetor reeds and/or gaskets.
(17) Flush fuel tank periodically.
(18) Prepare saw for storage.
(19) Replace piston rings.
(20) Sharpen blade using mechanical sharpener.

b. Maintain skidder. 2.5

(1) Lubricate all grease fittings at proper intervals using appropriate lubricant.
(2) Maintain engine oil level, coolant level, transmission oil level, hydraulic oil level, and fuel level on a daily basis.
(3) Change engine oil and filters, and transmission oil and filters, and hydraulic oil and filters on a periodic basis using proper oils and replacement filters.
(4) Maintain fan belt tension.
(5) Adjust brakes.
(6) Clean battery cables and terminals.
(7) Adjust clutch as applicable.
(8) Drain water and dirt from fuel tank and filters.
(9) Adjust steering controls.
(10) Adjust diesel injectors.
(11) Time diesel injections.

c. Maintain knuckle-boom loader. 2.4

(1) Maintain power unit oil level, coolant level, and battery electrolyte level.
(2) Maintain hydraulic oil level.
(3) Lubricate all grease fittings using proper lubricant.
(4) Clean hydraulic oil breather.
(5) Change hydraulic oil and filter using proper oil and replacement filters.
(6) Replace ruptured hydraulic lines.
(7) Clean loader of dirt, leaves, dust, etc.
(8) Repair leaking hydraulic cylinders.
(9) Replace leaking seals.

d. Maintain trucks. 2.4

(1) Maintain engine oil, battery, and fuel levels on a daily basis.
(2) Change engine oil and filter.
(3) Maintain tire air pressure and checks for cuts and scrapes.
(4) Lubricate chassis and drive shaft(s).
(5) Maintain battery terminals and clamps.
(6) Maintain brake fluid level.
(7) Service or replace air cleaner.
(8) Adjust brakes.
(9) Replace spark plugs (if applicable).

(10) Maintain fan belt tension.
(11) Adjust clutch if provided.
(12) Adjust carburetor (if applicable).
(13) Replace brake shoes or pads.
(14) Replace ignition points (if applicable).
(15) Replace exhaust system.
(16) Replace clutch if provided.
(17) Replace wheel bearings.
(18) Wash truck.
(19) Clean engine using steam cleaner.
(20) Repair frame using electric arc or acetylene welder.

e. Maintain wire rope. 1.4

(1) Install wire rope on winch.
(2) Lubricate wire rope.
(3) Cut wire rope using cutting torch.
(4) Cut wire rope using abrasive cutter.
(5) Install ferrules.
(6) Cut wire rope using shears.

SAWYER

Job Description:

The occupation may consist of setting up and operating power-driven circular and abrasive saws and band saws to cut lumber to specific dimensions; installing blades in saws and setting guide bars and stops; positioning material on saw table; starting saws and feeding material to blade; verifying dimensions of pieces using micrometer, gauges and rule; examining pieces for defects such as chipped edges or marred surfaces, and sorting defective pieces according to defect.

Competencies Identified and Validated

N = 34*

Competencies		Weighted Mean**
1.	Perform general operation activities.	3.0
a.	Check sources of power for operation.	3.3
b.	Maintain proper working condition of machinery.	3.3
c.	Maintain proper working condition of power system.	2.9
d.	Have knowledge of the function of all mobile equipment.	2.8
e.	Know the location of all fire extinguishers.	2.9
f.	Know the location of all fire hoses.	3.0
g.	Check fire extinguishers and determine workability.	2.6
h.	Be sure that the work area is left in safe condition and properly secured.	3.1
2.	Practice first aid and safety.	3.1
a.	Know how and when to protect eyes and ears.	3.5
b.	Know how to handle various materials.	2.9
c.	Know the type of dress that is suitable for each operation.	2.9
d.	Clear area of dangerous materials.	3.0
e.	Know safety equipment that should be worn at all times in all areas.	3.1
f.	Know who to notify in case of an accident.	3.4
g.	Have knowledge of first aid and how to apply it.	2.7

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* Responses from 34 Sawmill Workers and/or their Work Supervisors in 17 states. Survey conducted by Department of Agricultural Education, Alcorn State University, Lorman, Mississippi 39096.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	h.	Know signals to give when workers are to vacate an area.	3.0
3.		Operate carriage.	2.9
	a.	Have knowledge of distance and space.	3.2
	b.	Be able to ride short distances backwards and forward when necessary.	1.8
	c.	Check rollers and coasters.	2.8
	d.	Check bearings and fittings.	3.1
	e.	Check feeding system.	3.2
	f.	Make safety check of work area.	3.2
4.		Operate circular saw.	3.1
	a.	Check teeth for sharpness.	3.4
	b.	Check work area for safety.	3.4
	c.	Check teeth for damage.	3.5
	d.	Have knowledge of pulley operation.	2.8
	e.	Check belts for operation.	3.1
	f.	Check the electrical system.	2.7
	g.	Maintain a constant flow of logs going through the saw.	3.4
	h.	Have knowledge of feeding logs into saw.	3.8
	i.	Check all work area for foreign material.	3.2
	j.	Determine the necessary time to change saw blade.	3.2
	k.	Sharpen saw teeth.	2.3
	l.	Adjust saw for adequate operation.	2.9
5.		Operate log conveyer.	2.3
	a.	Check all points for lubrication.	2.1
	b.	Make complete safety check.	2.9
	c.	Know pulley sizes.	2.0
	d.	Know pulley ratios.	1.9
	e.	Know belt sizes and materials.	2.0
	f.	Have knowledge of conveyer function and limitations.	2.9
	g.	Have knowledge of drive chain sizes and function.	2.0
	h.	Have knowledge of driven chain size and function.	2.4
6.		Determine grade and quality of lumber.	3.5
	a.	Understand the transformation of logs to lumber.	3.8
	b.	Know the types of logs.	3.7
	c.	Know the types of lumber.	3.7
	d.	Understand various cuts of lumber.	3.7
	e.	Understand lumber size.	3.7
	f.	Know how to calculate board feet.	3.3
	g.	Understand regular and special length lumber.	3.5
	h.	Know grades of lumber.	3.5
	i.	Know condition of lumber.	3.1

7.	Operate quad saw.	2.7
a.	Make sure DSI auto sealer is on and functioning.	2.7
b.	Check all working area for foreign materials.	2.7
c.	Examine log deck for proper number of logs.	2.5
d.	Check all saws for proper function and sharpness.	2.7
e.	Check parts for proper oil level.	2.7
f.	Start infeed chain.	2.9
g.	Start cutoff saws and chain bed.	2.8
h.	Keep a constant flow of logs into cutoff saw.	2.7
i.	Feed logs one at a time.	2.7
j.	Remove all portions not suitable for quad saw.	2.7

SAWMILL WORKER

Job Description:

The occupation of Sawmill Worker consists of the following duties in preparing logs for cutting into lumber and storing cut lumber in sawmill: unload logs from trucks and/or cars; roll logs onto sawmill deck; examine logs for defects such as imbedded pieces of iron or stone, decayed wood and splits, and mark defects for removal; roll logs from deck onto log carriage; adjust position of log on carriage to cut lumber of required thickness and width; sort and guide planks from saw onto roller tables and/or conveyors and trim edges; straighten lumber on conveyors and operate sawing machine to straighten edges of rough lumber. May sharpen and adjust teeth of saws, and may tend fires in donkey engine.

Competencies Identified and Validated

N = 34*

Competencies		Weighted Mean**
1.	Practice first aid and safety.	3.3
a.	Know how and when to protect eyes and ears.	3.6
b.	Have knowledge of how to handle various materials.	3.3
c.	Have knowledge of the type of dress suitable for each operation.	3.9
d.	Clear area of dangerous materials.	3.2
e.	Have knowledge of the protective equipment that should be worn at all times in all areas.	3.2
f.	Know who to notify in case of an accident.	3.6
g.	Know basic information concerning first aid and how to apply it.	3.1
h.	Know signals to give when workers are to vacate an area.	3.0
2.	Operate debarker.	3.2
a.	Check debarker knives for sharpness.	3.3
b.	Examine debarker for damage.	3.4
c.	Check solenoid on chain oiler to make sure it is working properly and set flow according to procedure in manual under lubrication.	2.8

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* Responses from 34 Sawmill Workers and/or their Work Supervisors in 17 states. Survey conducted by Department of Agricultural Education, Alcorn State University, Lorman, Mississippi 39096.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	d.	Check oil level in gear case.	3.2
	e.	Check minimum shutdown pressure switches located on either side of debarker to make sure they are in working order.	3.1
	f.	Check electrical interlock; this insures the feed works will not operate without the rotor already in operation.	2.7
	g.	Add air pressure to bath infeed and outfeed systems and also rotor.	2.9
	h.	Properly lubricate the equipment.	3.1
	i.	Select the proper feed rate, rotor and feed mechanism air pressure.	3.1
	j.	Maintain a constant flow of logs going through the debarker.	3.6
	k.	Feed logs one at a time into debarker.	3.5
	l.	Make sure logs are clear of rotor before stopping debarker.	3.4
3.	Operate cut-off saw.		3.3
	a.	Check all working areas for foreign materials.	3.4
	b.	Examine log deck for proper number of logs.	2.8
	c.	Check all saws for proper function and sharpness.	3.4
	d.	Check parts for proper oil levels.	3.4
	e.	Start infeed chain.	3.5
	f.	Start cutoff saws and chain bed.	3.5
	g.	Keep a constant flow of logs into cut-off saw.	3.5
	h.	Feed logs one at a time.	3.5
	i.	Remove all portions not suitable for quad saw.	3.0
4.	Operate truck scales.		3.3
	a.	Clear concrete weighing slab of obstructions.	3.3
	b.	Turn on weighing scale.	3.4
	c.	Test stamper to see if it is working.	3.2
	d.	Check pit for water accumulation and pump out with sump pump.	3.2
	e.	Weigh trucks coming in and make a heavy weight ticket.	3.4
	f.	Weigh trucks leaving and make a heavy weight ticket.	3.3
5.	Operate bush log crane.		2.9
	a.	Check oil and equipment.	2.8
	b.	Check hydraulic arms for proper function.	3.0
	c.	Stack logs on the log yard.	3.0
	d.	Maintain an even flow of logs to the infeed chain.	3.0
	e.	Store excess logs on the hold decks.	2.8

6.		Operate stacker - mobile equipment.	3.2
	a.	Check brakes, tires and oil.	3.6
	b.	Check hydraulic arms for proper function.	3.5
	c.	Straighten up logs on the log yard.	3.3
	d.	Help log crane hoist maintain an even flow of logs to the infeed chain.	3.2
	e.	Store excess logs on the hold decks.	3.0
	f.	Attach and operate the bucket scoop to clean the log yard.	2.9
	g.	Attach scoop to loading forks.	2.7
7.		Operate separator.	3.0
	a.	See that rolls in drop area are running.	3.4
	b.	Straighten lumber in drops if needed.	3.1
	c.	Straighten lumber by use of the lift stops.	2.9
	d.	Unplug all plug ups that occur in the separator work area.	3.1
	e.	Operate the pedals which operate the following:	
		(1) Edge drop--boards to be edged.	3.2
		(2) Chipper drop--slabs that will not make lumber.	3.1
		(3) Resaw drop--slabs that will produce usable lumber.	3.0
	f.	Assist the lumber straightener as needed.	2.9
	g.	Replace chains when they come off.	2.7
	h.	Assist in changing saws at quad mill.	2.3
	i.	Keep work area clean.	2.9
8.		Operate edger.	3.5
	a.	Check saws to make sure the edger is clear.	3.6
	b.	Check light lines for proper operation.	3.5
	c.	Start the edger.	3.6
	d.	Select boards to be edged and lift bumper so the sweep chains will transfer them from the bandmill outfeed rolls to the edge.	3.5
	e.	Edge all boards with full wane, bark, or any boards which do not have two even parallel sides; however, if there's a slab which will not make lumber, let it pass by on the outfeed rolls from the bandmill to the slab tripper where it will be diverted to the chipper.	3.6
	f.	Space boards so they will not overlap at outfeed of edger.	3.4
9.		Operate resaw.	3.0
	a.	Fill oil cup for the saws.	3.0
	b.	Check blade to see if it is cracked or broken.	3.3

c.	Set up the machine.	3.0
	(1) Adjust clamp feed rolls.	2.9
	(2) Run a piece of lumber, measure and adjust accordingly.	3.2
d.	Keep a constant flow of lumber going through the machine.	3.2
e.	Continually observe the saw to see that it is not snaking or running off center; adjust it if necessary.	3.2
f.	Measure lumber periodically to see if the machine is still set correctly.	2.8
g.	Grease all fittings on the resaw once a week.	2.8
h.	Blow down the machine periodically during the shift.	2.9
i.	Change saw as required.	2.6
j.	Change saw guides as necessary.	3.5
10.	Operate trimmer-mill.	3.2
a.	Check for lock out tags.	3.4
b.	Make sure trimmer or drop area is clear of personnel.	3.6
c.	Inspect chains and lugs or feed table for broken chains, lugs or sprockets.	3.3
d.	Check saws for sharpness, securely fastened and see that all of them drop properly.	3.2
e.	Change saws weekly as needed.	2.8
f.	Grease fitting on trim saws once a week.	2.8
g.	Make checks of set works, scrap conveyor, all chains, and bumper shears.	2.8
h.	Cut up trims of slabs that won't make number 3 and better lumber.	3.3
i.	Feed only one piece of lumber for each row of lugs.	3.3
j.	Watch for plug ups where the wood drops onto the transfer belt.	3.4
11.	Operate sorter tender.	3.1
a.	Check for look out tags.	2.9
b.	Observe equipment for possible machine defects.	3.1
c.	Remove debris that may cause machine malfunctions.	3.2
d.	Start chain, automatic sort system and automatic lumber tally and make sure all counters are on zero.	3.3
e.	Check all rolls and chains for correct operation.	3.2
f.	Watch for excessive recirculation.	3.0
g.	Make sure no jams occur.	3.0
h.	Maintain a constant even flow of material.	3.2
i.	Feed one piece at a time.	3.2

12.	Operate stacker.	3.4
a.	Start stacker and test run empty to check for proper operation.	3.6
b.	Keep a constant flow of logs going onto the stacker arms for stacking.	3.0
c.	Straighten all lumber on the chains.	3.5
d.	Throw out all broken pieces.	3.2
e.	Unplug all plug-ups in stacker area.	3.5
13.	Operate planer.	3.3
a.	Fill oil cups for the heads with oil.	3.3
b.	Grease the fan motors, drive chain motors and all fittings with hand gun once a week.	3.3
c.	Change heads to fit the run if necessary and adjust to the correct size.	3.4
d.	Change knives once a week or as needed.	3.3
e.	Clean pit under planer daily.	2.8
f.	Keep a constant flow of lumber going through the planer.	3.5
g.	Run new loads onto the hoist and elevate to the infeed.	3.3
h.	Observe the planer for proper functioning.	3.5
i.	Gauge lumber as often as possible.	3.6
j.	Throw out lumber over the infeed table which will not go through the planer.	3.1
14.	Operate grader.	3.4
a.	Put ink on stamp.	3.3
b.	Make sure proper stamps are being used.	3.5
c.	Have a thorough knowledge of SPIB grading rules.	3.4
d.	Maintain 95% or better accuracy in grading lumber.	3.6
15.	Operate trimmer planer.	3.2
a.	Blow trimmer down.	2.9
b.	Start conveyor belt under trimmer.	3.2
c.	Check to make sure belts are operating properly.	3.2
d.	Start trim saws and chains.	3.3
	(1) See that limit switches are working.	3.3
	(2) Check stampers.	3.6
	(3) Make sure chain lugs are in line.	3.3
e.	Keep a constant flow of lumber feeding into the trim saw.	3.3
f.	Make sure all lumber is trimmed and properly stacked.	3.4
g.	Check to see that the lumber holddowns are in the down position.	3.2
h.	Change stamps for 6" and wider lumber.	2.9

16.	Perform tallyman duties.		3.4
	a.	Tally all incoming and outgoing lumber at the shipping area.	3.7
	b.	Load rail cars and/or trucks.	3.0
	c.	Have a knowledge of the date, number, size, length, and grade of incoming lumber.	3.6
	d.	Record information from load of outgoing lumber.	3.5
	e.	Put order number on outgoing lumber.	3.4
	f.	Notify send-in person if any problems arise.	3.2
	g.	Perform other duties as assigned.	3.2
17.	Perform mill maintenance.		3.0
	a.	Keep sprinkler system functioning and watch for unauthorized personnel on the premises.	3.1
	b.	Keep unauthorized personnel off premises.	2.5
	c.	Maintain and repair all electrical malfunctions.	3.3
	d.	Repair and maintain all mill machinery.	3.3
	e.	Weld all mill machinery in need of welding and assist in any mill machinery repair.	3.2
	f.	Sharpen saw blades when needed.	2.6
	g.	Repair and maintain all mobile equipment.	3.1

FIRE RANGER

Other Titles: Fire Patrolman, Fire Inspector, Smoke Chaser.

Job Description:

The Fire Ranger patrols an assigned area of a forest to locate and report fires and hazardous conditions, and to insure compliance with fire regulations by travelers in the field. Reports findings and receives and relays emergency calls, using telephones or two-way radio. Extinguishes small fires with portable extinguisher, shovel, and axe. May serve as crew leader for larger fires. May render assistance or first aid to lost or injured persons. May participate in search for lost travelers or campers.

Competencies Identified and Validated

N = 50*

Competencies		Weighted Mean**
1.	Be able to sustain self in remote areas for several days. (Camping skills).	2.6
2.	Have hiking skills.	2.7
3.	Obtain advanced Red Cross first-aid.	3.5
4.	Have knowledge of search and rescue techniques.	3.4
5.	Use a map and compass.	3.6
6.	Encourage safety among public.	3.3
7.	Know local and state fire laws.	3.4
8.	Have the ability to enforce fire laws.	3.3
9.	Keep records.	2.5
	a. Citations.	2.7
	b. Campers/Hikers.	2.6
	c. Water (rainfall).	2.6
	d. Water tables.	2.3
	e. Erosion damage.	2.0
10.	Know ground to aircraft signals.	3.0
11.	Know radio procedures.	3.2

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* Responses from 50 Fire Rangers in 22 states. Survey conducted by Occupational Education Program, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

a.	10-Codes.	3.2
b.	Proper broadcasting procedures.	3.2
12.	Lay and splice telephone lines.	2.2
13.	Have the ability to ride a horse and care for a horse.	1.8
14.	Know four wheel drive.	2.8
a.	Driving skills.	3.5
b.	Maintenance and repair.	2.4
15.	Evaluate the damage of fires and area burned.	3.5
16.	Write reports.	3.3
17.	Work under minimum supervision.	3.5
18.	Serve as crew leader for larger fires.	3.4
19.	Have the skills of a forest fire fighter.	3.2
a.	Know the behavior of fire.	3.6
b.	Know the effect of topography, weather, and vegetation on the behavior of fire.	3.6
c.	Know how to apply water to a fire.	3.5
d.	Ability to extinguish flames and embers using:	
(1)	A hand pump.	3.5
(2)	An axe.	3.4
(3)	A shovel.	3.4
(4)	Engine-driven pumps.	3.4
(5)	A chainsaw.	3.1
e.	Know the capabilities of air support in fighting forest fires.	3.3
f.	Ability to dig trenches and clear ground litter.	3.1
g.	Have the ability to fell trees.	2.8
20.	Know the nomenclature, use and maintenance of:	2.8
a.	Pulaski axe.	3.2
b.	Hose.	3.1
c.	McLeod.	3.0
d.	Brush hook.	2.9
e.	Council tool.	2.9
f.	Nozzles.	2.9
g.	Hazel hoe.	2.8
h.	Lanterns.	2.8
i.	Double-bit axe.	2.8
j.	Grub hoe.	2.7
k.	Brooms.	2.6
l.	Two man cross-cut saw.	2.6
m.	Kenny rakes.	2.6
n.	Peevee.	2.5

o. Fire swatter.	2.4
21. Have knowledge of after fire mop-up procedures.	2.6

FOREST FIRE FIGHTER

Other Titles: Fire Crewman, Smoke Eater.

Job Description:

The Forest Fire Fighter works under the supervision of the Fire-Suppression Crew Leader. Suppresses fires, working along or as a member of a crew; fells trees, digs ditches, and extinguishes flames and embers to suppress fire, using axe, chainsaw, shovel, and hand or engine driven pumps; patrols burned area after fire to watch for hot spots that may restart fires. May cut brush, clear groundlitter, and ignite back fires to hasten burnout of major fire within contained area and to prevent its spread across fire lines.

Competencies Identified and Validated

N = 55*

Competencies	Weighted Mean**
1. Know the behavior of fire.	3.3
2. Know the effect of topography, weather, and vegetation on the behavior of fire.	3.2
3. Know the ten orders of fire safety.	3.3
4. Know the capabilities of air support in fighting forest fires.	2.3
5. Know how to apply water to a fire.	3.4
6. Have the ability to extinguish flames and embers.	3.3
a. Shovel.	3.4
b. Use a fire axe.	3.3
c. Hand pump.	3.3
d. Engine-driven pumps.	3.1
e. Use a chainsaw.	3.0
7. Be able to fell trees.	3.0
8. Be able to dig trenches and clear ground litter.	3.2
9. Be able to ignite a back fire properly.	3.1
10. Have basic Red Cross First Aid.	3.1
11. Know of after fire mop-up procedures.	3.2

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* Responses from 55 Forest Fire Fighters in 22 states. Survey conducted by Occupational Education Program, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

12.	Have the ability to use a two-way radio.	2.6
a.	Know the use of 10-codes.	2.6
b.	Know the use of forestry codes.	2.5
c.	Know the proper broadcasting procedures.	2.7
13.	Know the nomenclature, use, and maintenance of:	2.6
a.	Nozzles.	3.0
b.	Hose.	3.0
c.	Chainsaw.	3.0
d.	Pulaski axe.	2.9
e.	Council tool.	2.8
f.	Double-bit axe.	2.8
g.	Brush hook.	2.7
h.	Fire swatter.	2.7
i.	Grub hoe.	2.6
j.	Lanterns.	2.5
k.	Two-man cross-cut saw.	2.5
l.	Hazel hoe.	2.5
m.	McLeod.	2.4
n.	Brooms.	2.3
o.	PeeVee.	2.2
p.	Kenny rakes.	2.2

FOREST INSECT RANGER

Job Description:

This is a sub-professional field work position. This position is assigned to a specific area and is responsible for inspecting and reporting on the disease and insect infested condition of forest and shade trees. When field identification is not possible, samples are submitted to a laboratory for analysis. Based upon results of surveys, the Forest Insect Ranger is expected to recommend appropriate eradication and control measures and must be able to accurately define the geographic limits of infestations for control by aerial spraying and other mechanical means. The worker in this position participates in considerable public contact work in acquainting landowners, citizens, and public officials with the nature of the control programs to be employed.

Competencies Identified and Validated

N = 35*

Competencies		Weighted Mean**
1.	Ability to orient self in woods.	3.9
2.	Ability to identify trees.	2.9
	a. By common Name.	3.5
	b. By buds and twigs.	3.1
	c. By bark.	3.0
	d. By shape of tree.	3.0
	e. By seeds.	2.8
	f. By scientific name.	2.5
	g. By aerial photography.	2.5
3.	Ability to identify diseases of trees.	3.1
	a. By common name.	3.5
	b. By damage caused.	3.5
	c. By specimen in the hand.	3.3
	d. Fungal disease.	2.9
	e. By scientific name.	2.8
	f. Bacterial disease.	2.8
	g. Viral disease.	2.8
4.	Ability to identify forest insect pests.	3.3

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* Responses from 35 Forest Insect Rangers in 22 states. Survey conducted by Occupational Education Program, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

	a. By common name.	3.5
	b. By the damage caused.	3.5
	c. In adult stage.	3.4
	d. In nymph or larval stage.	3.4
	e. By specimen in the hand.	3.3
	f. In egg stage.	3.2
	g. By scientific name.	2.8
5.	Pesticide use.	3.0
	a. Ability to read and understand pesticide labels.	3.8
	b. Ability to determine the proper pesticide and the proper application of pesticide to control forest pests.	3.6
	c. Knowledge of the current local, state, and federal pesticide application laws.	3.6
	d. Ability to operate a pesticide application device safely.	3.5
	e. Knowledge of the classification of pesticides.	3.3
	f. Ability to obtain a commercial pesticide applicators license.	3.2
	g. Knowledge of the capabilities of aerial application of pesticides.	3.1
6.	Ability to quantify and define forest damage.	3.4
	a. By plot work.	3.4
	b. By map making.	3.0
	c. By mensuration.	2.9
	d. By photogrammetry.	2.7
	e. By biometrics.	2.5
7.	Ability to keep accurate records.	3.4
8.	Ability to communicate effectively with the public.	3.3
	a. Orally.	3.3
	b. Written.	3.2
9.	Ability to work under a minimum of supervision.	3.3
10.	Ability to organize a days work.	3.5
11.	Possess a valid motor vehicle license.	3.7
12.	Ability to operate, maintain and repair small engines and pumps.	2.5

SMOKE JUMPER

Job Description:

Parachute from airplane into an inaccessible forest area to suppress forest fires. Orients self in relation to fire using map and equipment that are dropped by parachute from planes. Ascertain the best method of attacking the fire and communicate plan to plane or base camp by two-way radio. Fells trees, digs trenches, and extinguishes fires using axe, chainsaw, shovel, and hand or engine driven pumps. Prepares detailed written reports of activities and makes suggestions for all phases of parachuting smoke chasing, and fire fighting work assignments. Participates in scheduled physical conditioning and maintenance work while not performing fire suppression duties.

Competencies Identified and Validated

N = 47*

Competencies	Weighted Mean**
1. Obtain advanced Red Cross First Aid or equivalent.	3.8
2. Have knowledge of radio communications:	3.3
a. Knowledge of proper radio procedure.	3.4
b. Knowledge of Forestry Codes.	3.3
c. Knowledge of 10 Codes.	3.0
d. Knowledge of field repair.	3.0
3. Install antenna in trees.	2.9
4. Know hand signals for aircraft.	3.6
5. Know the capability of air support in fighting fires.	3.6
6. Know the behavior of fire.	3.8
7. Know the effect of weather, topography, and vegetation on fire behavior.	3.8
8. Know the ten orders of fire safety.	3.6
9. Relay water using Harodyke Bags.	2.4
10. Construct fire lines with hand tools.	3.8

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* Responses from 47 Smoke Jumpers in 22 states. Survey conducted by Occupational Education Program, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

11.	Fell trees using:	3.4
	a. Axe.	3.6
	b. Chainsaw.	3.7
	c. Two man cross-cut saw.	3.3
12.	Have knowledge of hand and gas driven pumps:	3.1
	a. Operation of pumps.	3.3
	b. Trouble shooting pumps.	3.2
	c. Repair of pumps.	3.0
	d. Use of lubricants.	3.0
13.	Repair and maintain a chainsaw.	3.3
14.	Maintain self in remote areas for days (camping skills).	3.7
15.	Have knowledge of ropes and knots.	3.3
16.	Be compatible with people under pressure.	3.7
17.	Repair parachute.	3.0
18.	Pack parachute.	3.3

FIRE WARDEN

Other Titles: Woods Fire Warden.

Job Description:

Responsible for the planning and directing of all forest fire protection activities in the assigned area and the supervising of fire patrolmen, lookouts, and forest rangers in the construction and maintenance of all facilities and the equipment required and assigned in their jurisdiction. Examines and inventories fire fighting equipment, such as axes, fire hoses, waterbuckets, and chemical fire extinguishers, to determine the amount and adequacy of the equipment and requisitions additional equipment when necessary. Fire Wardens will take charge of fire fighting activities until relieved, recruit temporary help and equipment and coordinate the work of fire suppression crews. Inspect forest, logging and mill areas for fire hazards, and report hazards to supervisor of area involved. May be required to restrict public use of forest area during fire season.

Competencies Identified and Validated

N = 47*

Competencies	Weighted Mean**
1. Knowledge of fire prevention and suppression methods and techniques and the equipment used in the suppression of fires.	3.9
2. Knowledge of the equipment used in the detection and locating fires.	3.9
3. Knowledge of instruments for obtaining weather data.	3.5
4. Ability to train others in the above competencies.	3.5
5. Abibility to organize and direct fire fighting crews of considerable size.	3.8
6. Ability to organize crews to aid in the search and rescue operations with other agencies.	3.1
7. Working knowledge of forestry and related laws, rules and regulations and the ability to enforce them fairly and impartially.	3.2

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* Responses from 47 Fire Wardens in 22 states. Survey conducted by Occupational Education Program, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

8.	Knowledge of technical forestry principles and practices.	2.7
9.	Knowledge of the use, care, and maintenance of forest fire control vehicles, machines, tools, equipment, and facilities.	3.5
10.	Ability to establish and maintain effective working relationships with other employees and the public.	3.6
11.	Capable of carrying on effective public relation programs in the field of fire prevention and suppression.	3.5
12.	Capable of recognizing fire hazards and the ability to correct the situation.	3.7
13.	Possession of a valid motor vehicle license.	3.8
14.	Ability to obtain a heavy commercial vehicle license.	2.8
15.	Ability to prepare accurate reports and present them clearly either orally or in writing.	3.6
16.	Ability to maintain complex records.	3.1
17.	Ability to prepare requisitions for fire control material and equipment.	3.4
18.	Knowledge of courtroom procedures.	2.7
19.	Ability to supervise maintenance of all fire fighting equipment, such as hand tools, back-pumps, hose, pumpers, tank trucks, and off road vehicles.	3.5
20.	Ability to perform strenuous physical and mental work for extended periods of time.	3.2

FOREST FIRE SUPPRESSION-CREW LEADER

Other Titles: Fire Protection Man, Crew Leader.

Job Description:

The Forest Fire Suppression-Crew Leader supervises and coordinates activities of crew that fells trees, digs ditches, and extinguishes flames and embers to suppress forest fires. Leads crew to area designated on a map by the Fire Warden and assigns workers to work stations along fire line. The Forest Fire Suppression - Crew Leader requisitions equipment and supplies for the crew. Assigns tasks to crew members to prevent over exertion of any one worker. Observes workers to detect signs of fatigue or illness from smoke inhalation and orders those affected to the base camp for treatment. Transmits information and receives instruction from the base camp or other units, using a portable two-way radio or other units, using a portable two-way radio or field telephone. May fight fire as a member of a crew. Submits time sheets for members of crew.

Competencies Identified and Validated

N = 51*

Competencies	Weighted Mean**
1. Ability to recognize fire hazards and knowledge to handle these situations.	3.8
2. Know the effect of topography, weather and vegetation on fire behavior.	3.7
3. Know the ten Orders of Fire Safety.	3.6
4. Ability to obtain Advanced Red Cross First Aid.	3.5
5. Ability to obtain a Heavy Vehicle License.	2.9
6. Ability to travel alone in a heavily wooded area.	3.5
7. Ability to read and use a map and compass.	3.7
8. Knowledge of the terrain and environs of the territory.	3.3
9. Ability to prepare accurate reports and present them clearly.	3.3

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* Responses from 51 Forest Fire Suppression Crew Leaders in 22 states. Survey conducted by Occupational Education Program, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

10.	Ability to maintain simple records.	3.4
11.	Ability to establish and maintain working conditions with associates, town officials, land and mill owners and the general public; and to secure cooperation in the fire prevention program.	3.0
12.	Ability to organize and establish fire lines and direct work crews for fighting fires and other activities.	3.8
13.	Physical stamina that is sufficient to perform strenuous labor involved in forest fire fighting.	3.6
14.	Ability to conduct fire suppression training schools.	3.1
15.	Ability to use a two-way radio.	3.2
	a. Knowledge of ten codes.	3.1
	b. Ability to broadcast properly.	3.3
16.	Ability to lay a telephone line.	1.8
	a. Ability to splice wires.	1.9
	b. Ability to set up a switch board.	1.7
17.	Ability to use a gas driven water pump.	2.9
	a. Knowledge of pump safety.	3.1
	b. Know how to run the six different types of water pumps.	3.0
	c. Know how to troubleshoot a pump.	2.9
	d. Knowledge of small engine repair.	2.7
18.	Ability to use a Harodyke Bag.	3.0
19.	Know the use of Back Fires.	3.5
20.	Know the capabilities of air support.	3.1
21.	Knowledge of fire mop-up procedures.	3.6
22.	Ability to use and repair tools.	3.0
	a. Council tool.	3.3
	b. Nozzles.	3.2
	c. Indian tanks.	3.2
	d. Brooms.	3.0
	e. Double-bit axe.	3.0
	f. Grub hoe.	2.9
	g. McLeod.	2.9
	h. Lanterns.	2.9
	i. Kenny rake.	2.9
	j. Peevee.	2.8
	k. Two man cross-cut saw.	2.8

CHRISTMAS TREE GROWER

Other Titles: Tree Farmer.

Job Description:

The Christmas Tree Grower is a person of many skills. The grower must be able to determine the suitability of an area for growing Christmas trees, plant and care for them, and harvest and market them. The grower is knowledgeable in the use of many hand and power tools and also has a general understanding of business. Basic job competencies include planting, spraying, shearing, harvesting, and marketing.

Competencies Identified and Validated

N = 85*

Competencies		Weighted Mean**
1.	Establish the Christmas tree plantation.	2.8
a.	Know what species are best suited for soil, topography, local climate, and site factors.	3.6
b.	Inspect and care for stock before planting.	3.5
c.	Obtain good quality seedlings.	3.4
d.	Determine number of trees to be planted and spacing to be used between trees and rows.	3.4
e.	Determine proper time of year to plant individual tree species.	3.3
f.	Determine suitability of topography and drainage.	3.2
g.	Operate safely chain saws, brush kings, machetes, etc.	3.2
h.	Maintain tools and equipment.	3.2
i.	Evaluate and understand future marketability and management systems for individual tree species.	3.0
j.	Lay out and maintain access roads and firebreaks.	3.0
k.	Determine suitability of soil by taking soil tests.	2.9
l.	Be aware of importance of planting several species where appropriate to avoid destruction of plantation by "host-specific" insects and diseases.	2.8

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* Responses from 85 Christmas Tree Growers in 32 states. Survey conducted by Department of Occupational Education, University of New Hampshire, Durham, New Hampshire 03824.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

m.	Plant seedlings using hand tools.	2.8
n.	Plant seedlings using mechanical equipment.	2.8
o.	Lay out rows using stake and cord method.	1.9
p.	Utilize space between trees for planting table-top trees and future crop trees.	1.4
q.	Lay out rows using compass and stake.	1.2
r.	Lay out rows using transit.	1.0
2.	Maintain natural stands.	2.6
a.	Weed out undesirable species by chemical or mechanical means.	3.0
b.	Maintain access roads and firebreaks.	2.8
c.	Shape and shear only better quality trees.	2.1
d.	Spot plants as needed.	2.0
3.	Control brush in plantation.	3.0
a.	Determine most effective type of herbicide to control grass, weeds, and brush while not damaging crop trees.	3.5
b.	Determine when to spray to control different species of grass, weeds, and brush.	3.5
c.	Prepare and store chemicals according to regulations and safety precautions.	3.5
d.	Comply with local, state, and federal regulations on the use of chemicals.	3.5
e.	Maintain a sound weed control program.	3.3
f.	Operate and maintain small tractor to mow grass and weeds between trees.	3.1
g.	Pass the "Private Applicators Test" for applying sprays on own land.	3.1
h.	Use and maintain hand pumps.	2.8
i.	Identify various grass, weeds, brush species.	2.7
j.	Use and maintain mist blower.	2.6
k.	Control stump regeneration of brush.	2.5
l.	Pass the "Commercial Applicators Test" for applying sprays on other's land.	1.8
4.	Control insect and diseases.	3.2
a.	Identify insects and their damage.	3.5
b.	Identify diseases and their damage.	3.5
c.	Determine when spray should be applied.	3.5
d.	Identify mechanical damage (herbicides, poor site, drought, mice, etc.) versus insect and disease damage.	3.4
e.	Know the effective life of each spraying.	3.2
f.	Operate and maintain spraying equipment.	3.2
g.	Determine method to be used to apply spray.	3.1
h.	Identify predators of harmful insects and understand effects of chemical treatment on beneficial insects.	3.0

i.	Know life cycle of most common insects and diseases.	2.8
5.	Improve the quality of Christmas trees.	3.1
a.	Shear each species at proper time of year.	3.7
b.	Use hand clippers, shearing knife, or mechanical means to shape and shear trees.	3.7
c.	Shape trees to achieve most desirable taper and fullness.	3.6
d.	Know when to terminal prune to reduce growth between whorls.	3.6
e.	Understand how a tree grows and responds to shearing and shaping.	3.6
f.	Know how to shear lateral shoots and branches so that growth will be more dense.	3.5
g.	Protect trees from fire.	3.4
h.	Maintain shearing tools.	3.4
i.	Determine when trees should be first sheared.	3.3
j.	Protect trees from damage by livestock.	3.0
k.	Know how to Basal prune branches at base of tree, when necessary, to increase foliage in upper tree and to produce a clear handle.	2.9
l.	Determine fertilizer needed to improve growth and vigor.	2.7
m.	Maintain fire equipment.	2.6
n.	Operate fire equipment.	2.5
o.	Select grade and ratio of fertilizer and apply it to stand to improve growth and color prior to harvesting.	2.5
p.	Maintain sound fertilizing program throughout management period of plantation.	2.5
q.	Use taper guide to shear trees.	2.4
6.	Harvest the trees.	2.9
a.	Use harvesting tools and equipment.	3.5
b.	Cut trees according to weather and species to insure that they remain fresh.	3.4
c.	Know conditions under which trees will remain fresh while awaiting shipment.	3.4
d.	Maintain harvesting equipment.	3.3
e.	Select and mark trees to be cut.	3.2
f.	Select harvesting equipment (saw, chainsaw).	3.0
g.	Harvest trees to allow for easy handling.	3.0
h.	Bundle trees for easy storage and shipment.	2.8
i.	Know and apply as necessary, various techniques; i.e., by spraying, frosting, etc.	2.8
j.	Eliminate cull trees while harvesting.	2.5
k.	Branches pruned off at cutting and cull trees are saved for by-products like wreaths.	2.2
l.	Be aware of stump culture.	1.9

7.	Market Christmas trees.	3.0
a.	Prepare income taxes and other forms.	3.8
b.	Keep records of receipts and expenses.	3.6
c.	Be aware of consumer preference in area.	3.3
d.	Have general knowledge of business management.	3.2
e.	Determine whether trees will be sold wholesale or retail.	3.1
f.	Market trees in advance of cutting season.	3.1
g.	Write sales agreements between buyer and seller stating a price for each species and quality, payment schedule, delivery date, liability, and other conditions of sales.	3.1
h.	Obtain appropriate insect and disease permits required for shipping Christmas trees.	3.1
i.	Understand appropriate federal, state, and local sources of marketing and silvicultural information and assistance.	3.0
j.	Set price for each tree depending on species, density, and height, grade and tag them, if trees are to be sold retail.	3.0
k.	Do an inventory of trees to be cut by age, species, height, density, and grade.	2.9
l.	Know national grading rules for Christmas trees.	2.6
m.	Have potential wholesale buyers inspect trees.	2.7
n.	Market low grade trees with premium trees for economic reasons.	1.9

MAPLE SYRUP PRODUCER

Other Titles: Sugarmaker, Maple Products Producer.

Job Description:

A Maple Syrup Producer must be able to perform a great variety of unskilled and skilled tasks. These tasks usually are performed on their own, under adverse weather conditions, including sub-zero temperatures, and often under considerable pressure of time. Few agricultural crops are so dependent on weather, requiring that the work be performed when the sap flows, whenever that might be, including weekends and late night hours. Examples of the type of work to be performed depend on the technology of the syrup operation. In a modern operation, plastic pipeline must be installed and maintained to create vacuum in the pipeline. The sap must be promptly boiled to standard syrup, graded, packaged, and marketed. In most operations the packaging and marketing must often be done throughout the year to obtain the best economic return for the crop. Other maple products such as sugar and spreads may be made, packaged, and marketed. In a wood-fired operation, fuel for the evaporators must be cut, split, stored, and dried a year before the time of use. Tapping trees, installing tubing, handing buckets, and collecting sap with a tractor or horses and sled must be done, often in deep snow. Employment in this occupation is by private industry.

Competencies Identified and Validated

N = 48*

Competencies	Weighted Mean**
1. Have knowledge of terrain.	3.0
a. Determine the correct layout of tubing lines or a road network.	3.7
b. Establish grade lines for pipelines or for roads.	3.4
c. Locate roads for ease of equipment operation and for maximum efficiency in gathering sap.	3.1
d. Make maps for pipeline system or for collecting roads.	2.4
e. Determine soil conditions, plan for drainage to prevent erosion, and avoid pollution.	2.2

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* Responses from 48 Maple Syrup Producers in four states. Survey conducted by Department of Vocational Education and Technology, University of Vermont, Burlington, Vermont 05401.

** 4.0 = Essential; 3.0 = Important; 2.0 = Of Some Importance; 1.0 = Not Important; 0 = Does Not Apply.

2.	Have knowledge of trees.		2.9
	a.	Select trees for tapping.	3.3
	b.	Establish correct number of taps per tree.	3.3
	c.	Tap trees to correct depth avoiding old tapholes or other wound wood and hollow trees.	3.2
	d.	Establish means of removing trees for firewood or other use without damaging crop trees.	3.1
	e.	Establish sugar bush management procedures such as weeding, thinning, selection of reserve trees, planting, and other details to ensure the best growth and highest production of sweet sap.	2.8
	f.	Recognize injurious insects and diseases, have some knowledge of control methods.	2.4
	g.	Test trees for sap sweetness.	2.2
	h.	Know how a tree grows and manufactures its food, and why sap flows.	2.0
3.	Have knowledge of sap collection.		3.3
	a.	Lay out pipeline system to take advantage of grade and other terrain features.	3.6
	b.	Install pipeline system to make most efficient system avoiding sags, kinked drops, etc.	3.6
	c.	Calculate proper pipeline sizes for numbers of taps involved.	3.5
	d.	Prepare sap storage facilities of adequate capacity in a cool, protected area.	3.2
	e.	Plan for and install vacuum pumps of correct size to overcome lack of grade and give maximum production during "weeping" flows.	2.9
	f.	Perform maintenance and minor repairs on electrical and internal combustion equipment.	2.7
4.	Have knowledge of syrup making.		3.3
	a.	Operate evaporator correctly.	3.8
	b.	Utilize instruments (hydrometer or refractometer and thermometer) properly to determine syrup density.	3.6
	c.	Recognize and use efficient firing methods to secure highest syrup quality at lowest energy cost.	3.5

	d.	Utilize proper cleaning and handling procedures to keep sap, syrup, and equipment in sanitary condition.	3.5
	e.	Decide how to store or pack syrup in regard to market requirements.	3.4
	f.	Be able to drill, solder, and rivet metal, also do carpentry work to keep evaporators, sugar house, and other equipment in good repair.	2.7
	g.	Utilize principles of basic electrical wiring and plumbing to install, operate, maintain, and repair syrup and syrup products processing equipment.	2.6
5.	Have knowledge of marketing.		3.0
	a.	Keep track of costs, compute profit margin, and sell for prices which keep business profitable.	3.3
	b.	Obtain markets to secure best return on crop.	3.2
	c.	Establish those public relations methods to aid in securing best markets.	2.9
	d.	Prepare other maple products to satisfy markets.	2.4
6.	Have knowledge of planning.		3.0
	a.	Secure supplies and materials for sap collection and syrup production for best economic return.	3.2
	b.	Plan for, hire, and supervise seasonal labor.	3.2
	c.	Plan to match amount and type of products to market; e.g., container size, type, and syrup grade.	2.9
	d.	Plan additional markets for bumper crop years and alternate sources of supply in short crop years.	2.7
7.	Have knowledge of record keeping.		3.1
	a.	Have knowledge, if full-time business, of financing, accounting, and merchandising.	3.3
	b.	Maintain adequate expense and sales record for tax and other purposes.	3.2
	c.	Maintain adequate production and sales records to evaluate forest management production and marketing decisions.	2.7

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